Southwestern AVIATION

AUGUST, 1934

DEC 15 1934

Wings for the Petroleum Industry

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The Howell Commission

+ +

The Fourth Airways District's Aids To Navigation

+ +

Riggers Pull The Ripcord

+ +

Aircraft 1934

Kinner
Bellanca
Ryan

20¢

A Personal Letter to All Business Men —

Southwestern AVIATION
Ledger Building
FORT WORTH, TEXAS

August 1, 1934.

Gentlemen:—

In this issue of *Southwestern* AVIATION you will find an account of the Petroleum Industry's adaptation of airplanes to their field of enterprise. Too, you will find Part II of G. C. Miller's comprehensive treatment of the Bureau of Air Commerce aids to air navigation, a sequel to his article which appeared last month dealing with the lighted aids and landing facilities offered the thousands of users of private and commercial aircraft.

Peruse this issue further and discover what YOUR own Government is doing to encourage the arts of the air.

Then ask yourself this question: "Why have I never investigated the opportunities and possibilities of owning an airplane in my business?"

You think nothing of getting in your car and driving three—even four or five hundred miles a day, to dispatch your business. Nor do you hesitate climbing aboard a train and spending days—even weeks—in travel about the country. You are habitually "frozen" to these slower, and actually more expensive (when you consider the time involved) modes of travel. Your grandfather who lived in the days of the horse and buggy was reticent to ride in "one of those blamed contraptions" known as automobiles. You laugh at him; yet you are apparently of the same water.

All we ask is that you investigate. Call your nearest licensed aircraft dealers for demonstration. They will gladly give you every courteous consideration. Write to all the aircraft manufacturers for information. Tell them about your specific transportation problems and ask them how an airplane can be utilized to speed up your business and effect economies. Discover for yourself the low cost of operation and maintenance and compare the figures with your present set-up.

The Industry is producing better planes at prices you can afford to pay. Get all the information on the new 1934 models from your local dealers or direct from the manufacturer. Call on *Southwestern* AVIATION to assist you—we will be more than glad to help. It costs nothing to investigate!

Truly yours,

Southwestern AVIATION.

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NRA MEMBER U.S. WE DO OUR PART

Southwestern
AVIATION

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SOUTHWESTERN AVIATION is published on the first of each month by Southwestern Aviation Publishing Company, Ledger Building, Fort Worth, Texas.

Vol. II AUGUST, 1934 No. 2

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Single Copies 20c
Yearly Subscription: U. S. A. $2.00—Foreign $3.00

Manuscript and general copy deadline 20th of month preceding date of issue.

Editorials and Comments

An Opportunity for Service

THE importance of the newly appointed Howell Commission cannot be overestimated. The tremendous responsibility placed upon the shoulders of this select group of men is no less great than the responsibility automatically planted upon the shoulders of the aviation industry.

Before rational legislation can be recommended to the Congress it will be necessary for the Federal Aviation Commission to have heard the representatives of every important interest and school of opinion in American aviation. A variety of professional, industrial, legal and other associations and societies have already been notified of the Committee's hope that they will be active in collecting and transmitting material bearing upon the interests and activities, expressive of the collective opinions of their members.

The Commission desires the suggestions of those who can most effectively represent their collective views as witnesses during the hearings scheduled for the autumn months. Anyone who has information that he thinks might be of help in the broad study of the desirable future course of American air policy should lay such material before the Commission in the form of a statement, accompanied by such documentary or statistical material as may be possible to provide.

No greater opportunity for the industry to serve its own interests has ever existed in the history of American aviation.

Enviable Record

A GREAT deal of satisfaction will accrue to the tax-paying citizen who reads the annual report of the Bureau of Air Commerce for the fiscal year ending June 30, 1934. The report is a record of accomplishment unsurpassed by any previous year since the establishment of the Aeronautics Branch of the Department of Commerce. The entire organization has operated at a high degree of efficiency on a budget of $5,200,000—$2,400,000 less than Congress provided for the 1934 fiscal year. An average for the last four years has been more than $8,500,000 annually.

It is remarkable too, that the economies which have been effected through the special economy budget have not produced "economy" hazards. In fact, the various Federal services to airmen and to air companies have actually been increased.

The accomplishments for the fiscal year just ended are too numerous to mention. However, the mark of progress is indelibly stamped on every undertaking, whether it is in a continuation of the manifold aids to navigation, in regulatory work, or in new research and developments.

It is indeed refreshing to find a governmental agency operating with a surplus at the end of the fiscal year. Under the leadership of Director Eugene Vidal, the entire organization deserves a unanimous vote of appreciation not only from the overburdened taxpayer but from the industry it serves.

England for Defense

SURPRISE should not be manifested by the recent announcement of Stanley Baldwin, Lord President of the Council, upon the British Government's decision to constitute a five-year building program to increase and strengthen their Air Force. Realizing the futility of International disarmament negotiations along with the failure of the treaties to withhold nations from belligerent acts, the English plan is an excellent one. To attempt to set an example in disarmament when other nations continue to increase their armaments throughout these past years of futile negotiation is foolhardy. The present general unrest does not bespeak continued peace.

By their plan to increase the air arm, the British are recognizing the inherent value of aircraft as both an offensive and defensive weapon of war. Heretofore the airplane has been widely treated as a secondary weapon; it appears now that the true worth is recognized.

Current with the announcement by the British comes the report of the Baker Board, which has just completed an exhaustive study of our Military Aviation. Their recommendations are vehemently for an increased air arm. However, it is only a recommendation; but it is hoped that legislation will be enacted by Congress in its next session to establish our Air Force as a major weapon of defense, unsurpassed by the Britons or any other nation.

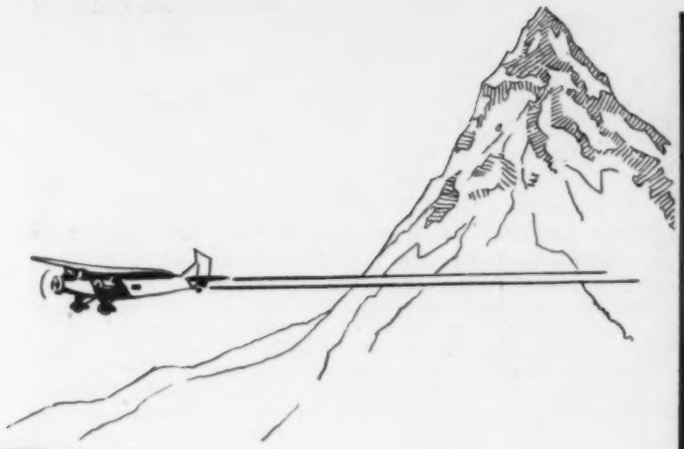
Your Protector

SEVERAL small "bootleg" aviation companies have been and are even now in existence. As a rule, these leeches on a legitimate industry buy small ads in popular class publications, and offer cheaply produced craft and accessories at give-away prices. Highly garnished printed matter usually follows an inquiry. If the "sucker" buys, he gets exactly what he pays for—junk.

One of these bootleggers was recently visited by a member of *Southwestern* AVIATION'S staff. It was discovered that propellors were being fabricated out of yellow pine with no particular attention to aerodynamic principles. A murderous looking craft was extolled as a "ground trainer." The controls were sealed; all that was necessary for the chump purchaser to do was to break the seal and voila! mayhap the crate would fly.

Many of the states have passed laws making it unlawful to fly unlicensed equipment. It is to be regretted that laws are not universal making the sale of unlicensed equipment illegal.

The warning goes out "Beware!" The Department of Commerce inspection service is for your protection. Use it. Investigate the company involved in any transaction in which there is doubt of the company's legitimacy. Investigate before you buy. Seek first of all Department of Commerce license and approval.



John H. Littley, now flying in the land of the Midnight Sun, one of 40 Parks graduates placed during the past 45 days.

From ALASKA To PERU PARKS GRADUATES ARE MAKING GOOD!

"FLYING is certainly different up here," writes Parks graduate John H. Littley from Anchorage, Alaska. "I am writing this at eleven o'clock and the sun is just setting. The colors are beautiful, blues, yellows, reds and purples and every combination of those, with the mountains silhouetted against the sky. I have flown over some areas that are not even on the maps; just blank spaces. Since I have been up here I have averaged at least one charter trip a day, with either freight or passengers to such points as McGrath, Fairbanks, Ophir, Flat, etc." Littley left Parks on June 19 for Alaska, where he is making good in a big way.

A letter just received from Ernest W. Grey, who received his special training and his transport license in May, states, "Here I am away down in Lima, Peru, as co-pilot and radio operator for Pan American-Grace Airways. My application seems to have hit the company just right, for here I am."

Littley and Grey are only two of more than 40 Parks men who have accepted good jobs within the past 45 days.

Parks Air College has never guaranteed or promised a job to any student, but it is an inspiring thing to have aircraft executives call on us with increasing frequency for well trained men. Parks graduates are working for every leading airline and airplane manufacturer, and on the finest airports in America. If you are ambitious and will work hard, aviation is calling you. But remember your entire future depends upon *where* and *how* you are trained. Aviation has no room for the untrained or poorly trained man. So choose Parks Air College—largest in the world—the School of Champions.

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Name..... Age.....

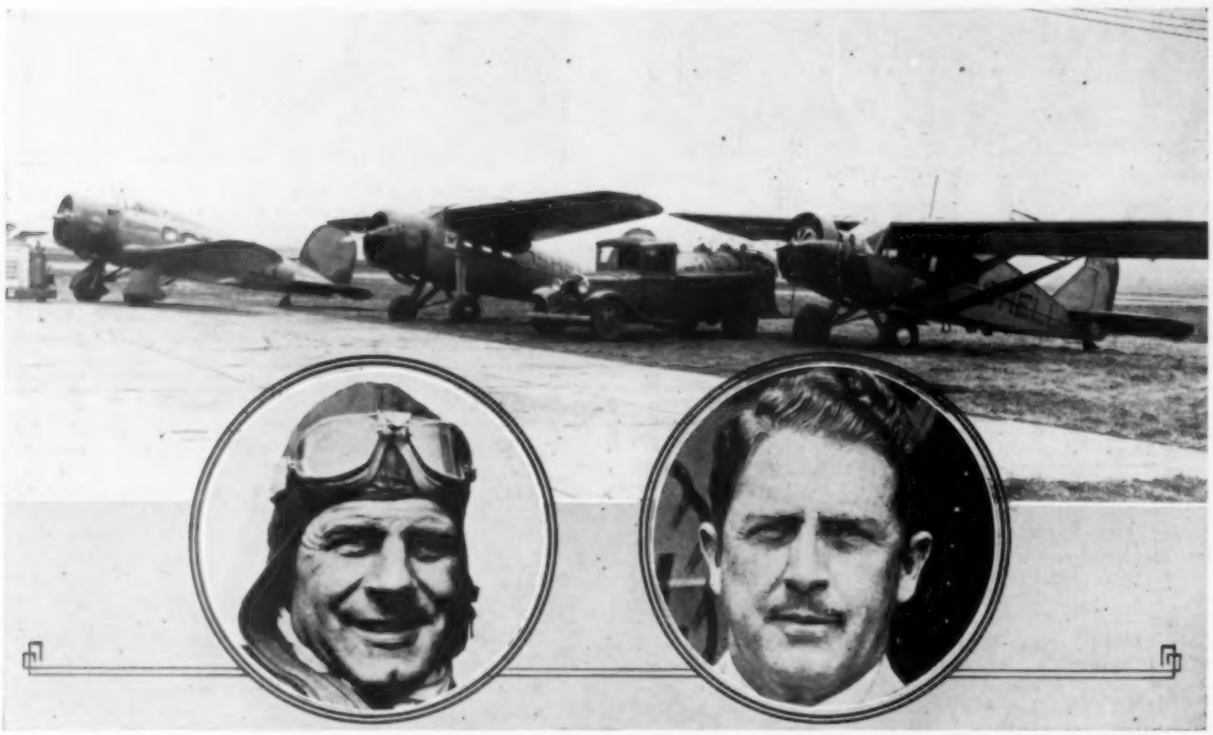
Address.....

City..... State.....

Wings for an Industry

OF THE myriad of industries utilizing aircraft to dispatch their business with speed, efficiency and safety, none so classically exemplifies the tried performance of aviation's superiority than the petroleum industry. Particularly in the great Southwest can we point with pride to an almost complete and universal adaptation of airplanes to the industry. Nor is it limited to the larger companies—this practically universal application of the most modern transportation facility available. The individual oil operator, lease men, refiners, marketers, geologists, drillers, producers—the percentage of those owning airplanes is larger than in any other industry. There is a reason.

In the following accounts of four oil companies' history in aviation, the paramount purpose involved is fast, efficient travel. Distances are great, and much has to be accomplished usually in a short time. No one factor so ideally illustrates the petroleum industry's progressiveness and modern business methods than its almost universal adaptation of airplanes in its ordinary dispatch of business.



A portion of the Shell Petroleum Company's fleet of Airplanes: The Lockheed Orion and Vega and the Bellanca Skyrocket. Insets are: Left, James H. Doolittle, Manager of the Aviation Department, and right, James G. Haizlip, Assistant Manager.

Shell Petroleum Corporation

THE SHELL PETROLEUM CORPORATION was one of the first members of the Petroleum Industry to realize the potentialities of the airplane and to utilize it in the regular course of its business. Shell's interest in Aviation has been with a two-fold purpose, i .e., to provide swift, safe transportation for its executives and to provide a laboratory for the flight testing of its aviation products under actual operating conditions.

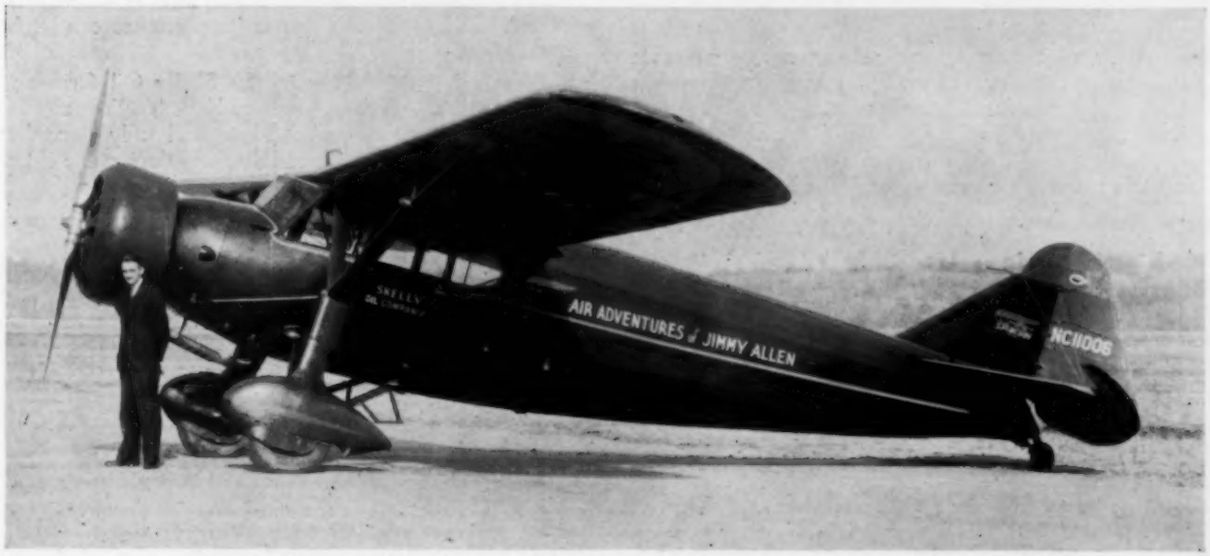
In 1929 Shell purchased its first airplane, a Fokker Tri-motor. In 1930 an Aviation Department was established with Major James H. Doolittle in charge. At that time Shell Aviation Products were introduced to the aviation industry. In the year immediately following, a Lockheed Vega, a Travel Air Mystery ship and a Bellanca Skyrocket were added to the Shell fleet. The Vega was flown by Mr. Doolittle in connection with air line and airport solicitation and general sales work. Captain James G. Haizlip has carried the executives of this company in the Bellanca over a greater part of the United States. The Mystery Ship visited most of the outstanding Air Races and Airport Dedications during the year and was flown in many interesting exhibitions of flying and races by Messrs. Doolittle and Haizlip. In June, 1932, in line with the established Shell policy of operating only the most modern equipment, the Company purchased a Lockheed Orion. This plane, powered by a Wright Cyclone engine and provided with retractable landing gear, was said to be the fastest commercial airplane in the world at that time; it brought the Shell headquarters in St. Louis to within a little more than four hours of New York and approximately nine hours to San Francisco. The latest edition to the Shell fleet is a trim Stinson Reliant equipped with wing flaps for operating in and out of small landing fields.

Since the entrance of Shell into the aviation indus-

try, it has utilized its planes to the fullest extent for testing its products. The Bellanca and Fokker were field laboratories from the testing of the first standard grade of aviation gasoline used in unsupercharged engines of low to medium horsepower. The Vega with its Wasp engine, equipped with a 10:1 blower, enabled Shell to produce an 80 octane gasoline of high quality, leaded 87 octane gasoline for supercharged engines of great horsepower.

Shell aviation products have been brought to the attention of air lines, airport operators and private fliers by the outstanding achievements of its two famed pilots, Major James H. Doolittle and Captain James G. Haizlip. These pilots have flown Shell products to most of the major aviation honors, such as the Thompson Trophy Race, the Bendix Trophy Race, the Shell Speed Dashes and the world's record for land planes.

From the standpoint of bringing the Shell organization closer together, as a result of fast transportation from one office to the other, because they have shown that they are valuable sales promotional and advertising media, and as test laboratories Shell's fleet of airplanes have proven themselves valuable and are constantly becoming more in demand.



Spartan de luxe cabin plane used by the marketing department of Skelly Oil Company. J. H. DeCelles, Chief Pilot of the Aviation Division, is shown in the photo.

Skelly Oil Company

ONE OF THE FIRST to see the great possibilities for the use of airplanes in the conduct of its business was the Skelly Oil Company whose home offices are in Tulsa, Oklahoma. Skelly Oil Company's marketing territory is spread over the entire Middle West, and very often it is necessary to cover many points in this wide territory in a short length of time. W. G. Skelly, President, and his executive officers felt the inadequacy of ordinary methods of transportation. Accordingly, they called upon the airplane to take them where they wanted to go—quickly, economically and safely.

In 1927 the Company's air corps was composed of seven biplanes, five of which were powered with Walters motors. Of the other two, one was a Spartan biplane powered with a 165 horsepower Wright motor, and one a Spartan biplane powered with a 240 horsepower Wright.

In 1930 Skelly placed J. H. "Doc" De Celles in charge of its official plane. His ability as a pilot has always been widely known and his knowledge of aviation dates from the early days of flying.

Perhaps the most outstanding use to which Skelly Oil Company has ever put its aerial effort was in 1932, when an extensive goodwill tour was conducted over a large part of Skelly territory. Flying an open cockpit Spartan biplane powered with a 165 horsepower Wright motor, the pilot visited ninety-three Minnesota, Wisconsin and North Dakota towns and cities. An average of twelve persons from each town enjoyed airplane rides, with preference given those who had never before been in the air. Skelly Oil Company obtained a remarkable degree of publicity and comment from this type of advertising. It was inexpensive and quite acceptable to the northern wholesale and retail distributors.

From the standpoint of flying there was nothing spectacular about the trip. As on all Company trips the flights were ultra-conservative. There was no stunting, no parachute jumping—just short flights over town and countryside in order that people might see how their hinterland looked from the air. Speaking of stunting, when anybody asks "Doc" why he doesn't stunt, he merely replies with a twinkle in his eye, "I have four boys that I like mighty well and I get my fill of stunts when the factory brings out a new model." Weather conditions were perfect throughout the goodwill tour, and Skelly Oil Company succeeded in converting many skeptical persons to the feasibility of flying through its conservative attitude. The computed cost at the end of the tour was one and one half cents per passenger mile.

In 1933 the Company improved its equipment for their own use, and flew a four place cabin Spartan monoplane powered with a 240 horsepower Wright Whirlwind. This plane had many of the improvements of the modern transport plane. Its cruising speed was 115 miles per hour.

In the latter part of 1933 Skelly Oil Company made another improvement in its flying equipment, placing "Doc' De Celles in charge of a larger, more modern Spartan with a cabin for five passengers. The plane is powered with a 300 horsepower Wasp, Jr. which produces a cruising speed of 126 and a top speed of 145 miles per hour. It is equipped with all the necessary instruments for blind flying, as well as a radio for receiving weather reports and for flying the beam. It is heated for winter flying; last winter, taking off from the Minneapolis airport in subzero weather, the cabin maintained a comfortable temperature of about 70 to 75 degrees.

Following the change to the new equipment last November, the sales executives of the Company made the most concentrated use of their airplane transportation facilities. Sales meetings were being conducted by four crews in widely separated cities. Carrying W. G. Skelly, W. T. Atkins, Vice-President in charge of marketing and pilot De Celles, Skelly's Spartan could previously cover in a month by any other mode of transportation. The invaluable advertising element made two of these sales meetings a day for five days. fulfilling speaking engagement schedules for both executives without a hitch during the entire week—forceful proof that the use of airplanes is necessary in industry's every day business activity; for Skelly executives can cover as much territory in one week as they could previously cover in a month by any other mode of transportation. The advertising element cannot be overlooked.

The Aviation Division of the Skelly Oil Company can boast that its operatives have been 100% successful to date, never a forced landing and only once has weather ever delayed a scheduled trip during the entire period of operation.

In two months' time Humble's new Waco has flown one hundred and forty hours, the time being equally divided between direct sales and general utility work.

Humble Oil and Refining Company

THE PRIMARY MOTIVE which caused the Humble Company to purchase an airplane and establish an aviation department in August, 1932 was the increasing sale of Stanavo Aviation Gasoline and Engine Oil over the Southwest. The management, realizing the great markets available in the Southwest for their aviation products, thought it highly desirable to own and operate an airplane for the purpose of developing the aviation market. The first plane purchased at this time was a Wasp-powered Stearman, which gave remarkable service for over eighteen months, primarily in sales work in contacting the airports of the territory.

In June, 1933, all departments suddenly realized

Harry W. Howze, Humble's crack pilot and Manager of the Aviation Department. Under Howze's able leadership the Humble Company has learned the necessity of an airplane in the course of its regular business.

the general utility of the airplane in transacting the Company's business when Humble placed on the market the Humble Motor Fuel. It was necessary to hold sales meetings in each of the company's six districts. The meetings were to be held by the Manager of Sales, accompanied by the Advertising Director. The trip as first planned required a period of about ten days. The Aviation Department suggested that the airplane be used on this mission, and the suggestion was readily accepted. Early one morning, the plane departed from the Houston airport. At noon of the third day the mission had been completed—two and one-half days instead of ten! The actual saving involved was enormous.

The flight immediately brought to the attention of the Humble officials the invaluable service an airplane could render. Since the demonstration of the plane's utility on the first flight the plane has been used upon many occasions for such work, as well as in many other executive departments.

The present equipment includes a new four-place Waco, powered with a Wright J-6. It was purchased in May of this year for use of the Aviation Department in contacting Stanavo dealers and consumers. In two months the new Waco has flown one hundred and forty hours, the time being equally divided between direct sales work and general utility work. Each week it is being used more and more by the various departments of the company and is now considered an essential unit of the company equipment.

During 1933, the company airplane was flown two hundred and thirty-four hours. Up until July 20th of this year it has been flown two hundred hours; the total flying time for the year will, in all probability, be four hundred and fifty hours—almost double the time of 1933.

It is the company's firm conviction that the airplane is an essential piece of equipment for general utility, particularly when a company or an individual has a wide territory to cover. The operation of the Humble airplane has now well established the fact that the airplane is a safe means of fast, economical transportation, and a necessary factor in the industry.

Col. Arthur Goebel, winner of the Dole prize flight to Hawaii in 1927, is chief pilot of the Phillips Company. Art, as the other Petroleum Pilots, needs no introduction.

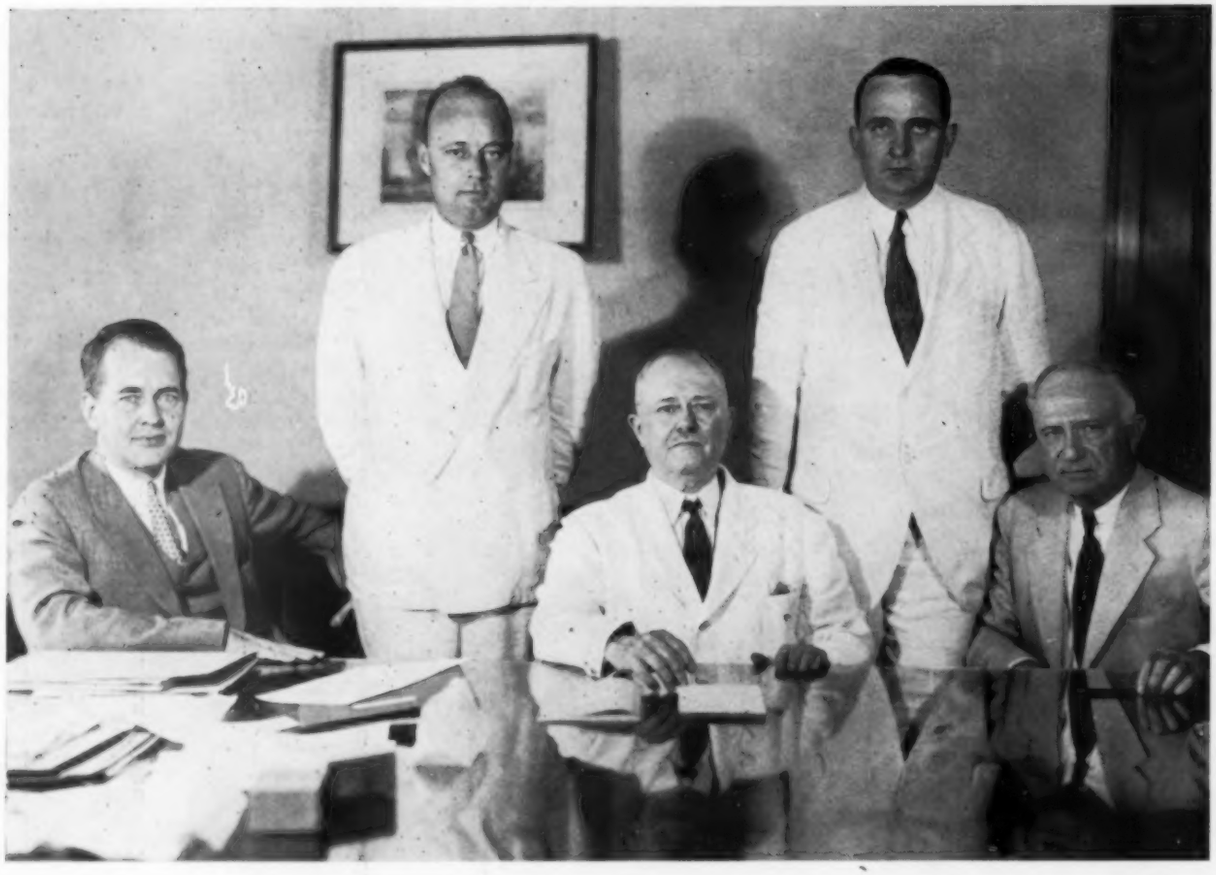
Frank Phillips, President of the Phillips Petroleum Company, whose varied experience in aviation extends over many years.

Phillips Petroleum Company

IN BARTLESVILLE, OKLAHOMA, are the general offices of the Phillips Petroleum Company. Founded in 1917 to take over the holdings of Frank and L. E. Phillips, successful operators, the organization now has interests in 33 states and Canada—interests which demand the employ of some twenty thousand individuals. A fully integrated unit of the oil industry, the Phillips Petroleum Company operates production properties in Kansas, Oklahoma and Texas, owns refineries at Borger, Texas, Okmulgee, Oklahoma, and Kansas City, Kansas, forwards crude and refined products to market

(Continued on page 29)

The Federal Aviation Commission



UNDERWOOD AND UNDERWOOD STUDIOS

FEDERAL AVIATION BOARD HOLDS FIRST MEETING

Members of the Federal Aviation Board, appointed by the President to study civil and military aviation and recommend such action as they feel will be beneficial for all concerned, including the question of unified military aviation for greater national defense, photographed recently, at Washington, where they began their deliberations.

Left to right, seated, Edward P. Warner, Clark Howell, Chairman, and Albert J. Berres; standing, Franklin K. Lane, Jr., and Major J. Carroll Cone, Secretary of the Board.

Clark Howell, Chairman

Clark Howell, outstanding Southern editor, was born in Barnwell County, South Carolina on September 21, 1883. He has been connected with the *Atlanta Constitution* since 1884. In that capacity he succeeded Henry W. Grady as managing editor on the latter's death in 1889, and succeeded his father as editor on the latter's retirement in 1897. He was a member of the Georgia House of Representatives from 1886 to 1924 (Speaker 1890-91). Member of the National Democratic Committee from 1892 to 1924. Member and President of the Georgia Senate from 1900 to 1906. He has been a director of the Associated Press since its organization in 1900. He was a trustee of the University of Georgia from 1896 to 1927. He was a member of the United States Coal Commission. Author of a History of Georgia. He was instrumental in the South's solid support of Roosevelt in 1931. His home is in Atlanta and his office in the *Constitution*.

Edward P. Warner, Vice-Chairman

Edward P. Warner was born at Pittsburgh, Pa., on November 9, 1894. He attended Harvard University and Massachusetts Institute of Technology. He is Editor of AVIATION, American Aeronautical magazine. He became the first appointee to a "baby cabiiet" position especially concerned with aeronautics when he was appointed Assistant Secretary of the Navy for Aeronautics by President Coolidge in 1926. He was later appointed a member of the National Advisory Committee for Aeronautics by President Hoover. President Roosevelt is thus the third President to select Mr. Warner for appointment in matters concrning aviation. His membership as one of the seven non-government members of the National Advisory Committee for Aeronautics came as an echo of his work as a member of the Committee's staff fourteen years ago. At that time he inaugurated the aeronautical research work at Langley Field, Va., which has

since developed into the greatest aeronautical aerodynamic laboratory in the world. Subsequently he represented the Advisory Committee as technical attache in Europe, securing information on aeronautical development there.

His active connection with aviation began twenty-four years ago when he designed and built a glider which won a prize for efficiency in the dynamics of Airplane Design. He was awarded the medal of the Aero Club of France for the best technical book published on an aeronautical subject during the year 1927, and in 1932 he was awarded the Wright Brothers Medal by the Society of Automotive Engineers for a paper on an airplane design subject. He is the author of *Aerostatics*, and co-author of the *Aviation Handbook*. He has written extensively on air policy and on aviation in international law and international relations. He is chairman of the Committee on the Bureau of Air Commerce of the Business Planning and Advisory Council, chairman of the Aviation Committee of the American Engineering Council, and Chairman of the Subcommittee on Aircraft Accidents of the National Advisory Committee for Aeronautics. He is a Fellow of the Institute of the Aeronautical Science, and of the Royal Aeronautical Society.

J. Carroll Cone, Executive Secretary

J. Carroll Cone, for the past 16 years prominently identified in both military and commercial aeronautics, was born in Snyder, Arkansas, July 4, 1892. He received his education in the public schools of Hamburg and Wilmot Arkansas, and was graduated from Ouachita College at Arkadelphia.

Determining upon a business career, he became connected with real estate and automobile interests. When it became apparent that the United States would enter the World War, he left his business connections in March, 1917 and enlisted in the Aviation Section of the Signal Corps. He received his flight training at the Old North Driving Park race track, at Memphis; Ashburn Field near Chicago and Rantoul, Illinois. In September, 1917, he was sent overseas as a first lieutenant with the third foreign detachment and was detailed as an instructor at the training center at Issoudon, France. He was the first American to serve in that capacity at that field and rose rapidly at this post. His duties at the training center reached a climax when he became commanding officer of Field No. 9, the final eliminating field, and officer in charge of training.

From Issoudon he was detailed to St. Jean de Mont for a course in aerial gunnery and due to his proficiency in this work, he was called upon to serve as an instructor while completing his course. From this school he was sent to the front lines to the Third Pursuit Group commanded by Major William Thaw, who previously had served with distinction in the Lafayette Escadrille. With this famous flying organization which included the Lafayette Escadrille as taken over from the French by the American Army, he served in three major engagements, the Toul defensive and the St. Mihiel and Argonne offensives. He was officially credited with one enemy aircraft, and has several unconfirmed victories. During the Argonne offensive he was promoted to the rank of captain. Three weeks before the Armistice was signed, he was ordered back to the United States to take charge of all aerial gunnery instruction, but succeeded in obtaining a delay which enabled him to be at the front when hostilities ceased.

After a brief tour of duty in Washington and at Rockwell Field, San Diego, he was mustered out of the service on March 4, 1919, and returned to Arkansas where he reentered business at Pine Bluff and a short time later was appointed Assistant Secretary of State.

His interest in aeronautics, however, did not wane with the end of the war. Recognizing the potential value of flying for the economic advancement of the nation as well as for national defense, he joined with the little group of enthusiasts which existed at that time to promote aviation in the United States. He bought a plane, and when he wore that out he purchased another—acquiring 13 in all. He became president of the Arkansas Aero Club, and an official of the National Aeronautics Association. He promoted and officiated at air meets and other gatherings designed to foster interest in aeronautics on the part of the public. He taught his daughter to fly and organized an aircraft company and built planes in Little Rock. He campaigned throughout the state by airplane for the office of State Auditor and was rewarded for his efforts by being elected twice to the post. As a further means of stimulating interest in aviation in his state, he organized the 154th Observation Squadron, Arkansas National Guard Air Service, and became its commanding officer with the rank of Major. This unit has enjoyed a high efficiency rating for the past six years.

Those activities dealing with advancing aviation in the State of Arkansas reached the pinnacle of achievement when he was selected to become director of Aeronautics for the state two years ago.

On December 22, 1933, Major Cone was notified by the War Department of his promotion to the rank of Lieutenant Colonel in the Army Air Corps Reserve. His assignment is in the Army and Service Division of the Office of the Chief of the Air Corps, the headquarters of which are in Washington.

Colonel Cone estimates that his total flying hours in the air during the past 16 years of uninterrupted flying is approximately 8,000.

He has been selected to serve as Secretary of the new Commission.

Jerome Clark Hunsaker

Jerome Clark Hunsaker, eminent aeronautical engineer, was born in Creston, Iowa, August 26, 1886. He graduated from the U. S. Naval Academy in 1908. He received the degree of Master of Science from the Massachusetts Institute of Technology in 1912 and the Doctor of Science degree in 1916.

He was a Naval Officer advancing to the grade of Commander, Construction Corps, U. S. N., 1909-1926. Instructor of aeronautical engineering M. I. T. 1912-1916 in charge of aircraft design, Navy Department, Washington (designed airship "Shenandoah" and Flying Boat NC4, first aircraft to fly the Atlantic, 1916-1923). Assistant Naval Attache at London, Paris, Berlin, Rome from 1923-1926. Assistant Vice President

(Continued on page 23)

The Fourth Airways District

of the

Air Navigation Division, Bureau of Air Commerce

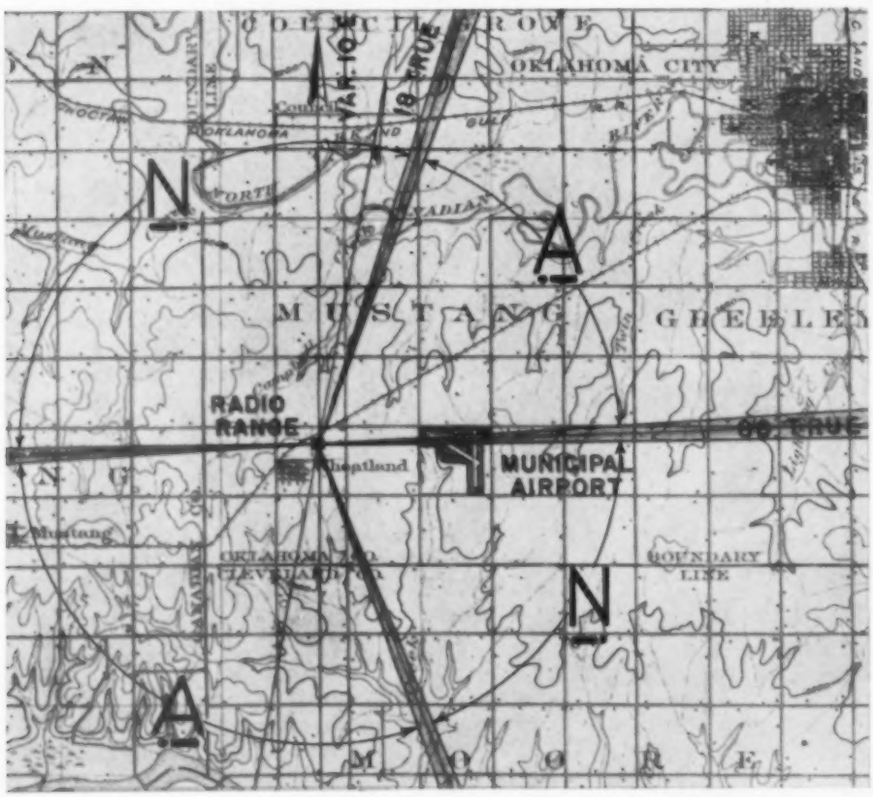
PART II

BY G. C. MILLER, Acting Superintendent of the Fourth District

AUTHOR'S NOTE

The previous article which appeared in the July issue of Southwestern AVIATION *dealt with the general organization of the Fourth District and its lighted aids. An effort will now be made to complete the picture of* Aids to Air Navigation *in the Southwest with a description of the radio facilities and the dissemination of weather information. The complete picture will illustrate the service rendered by the Bureau of Air Commerce to all who navigate the airways in the United States.*

In the operation of modern aircraft it is found that weather is practically the only obstacle to 100% performance records. However, scientific development of flight instruments and radio navigation aids is rapidly overcoming this last "bad wolf" of aviation. The present radio and lighted aids to air navigation, together with complete and up-to-the-minute weather information made available to the flying public through the communication systems and broadcast stations, contribute largely to the wonderful record of safety and regularity of American air transport schedules and private flight operations.



A LOCATION MAP OF THE OKLAHOMA CITY RADIO RANGE

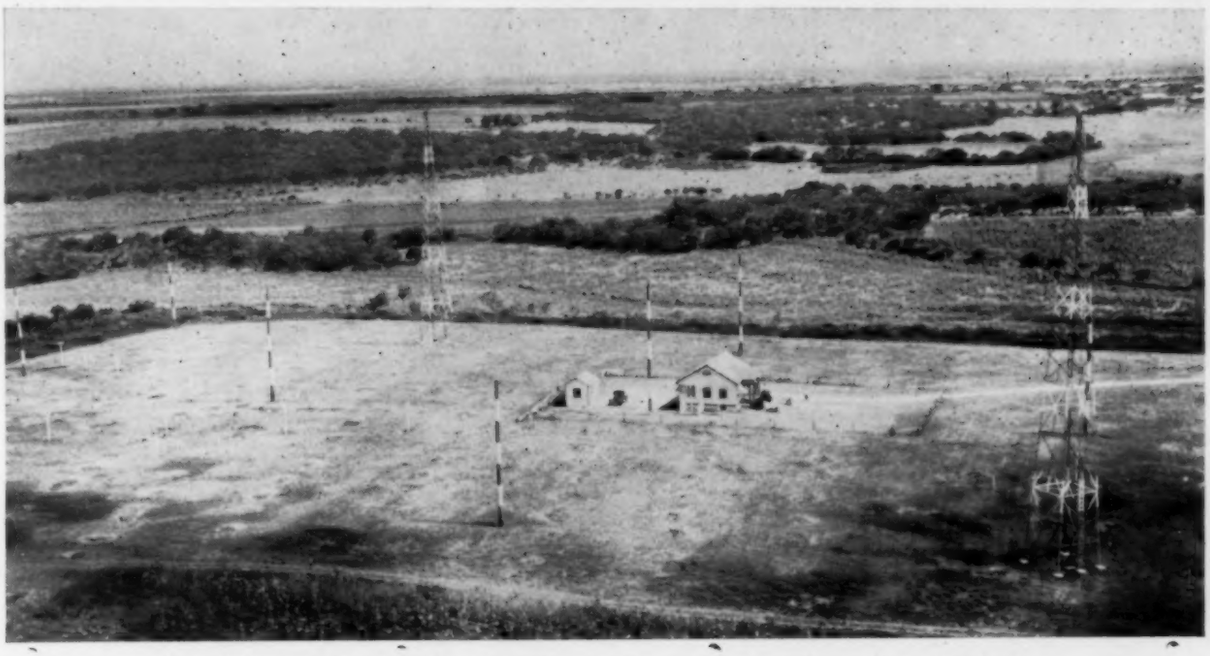
A pilot flying on any of the four courses hears an "on course" signal (a long dash) interrupted every twenty-five seconds by the identifying letters "OL" (dash-dash-dash dot-dash-dot-dot). If flying in any of the quadrants between the courses he hears N (dash-dot) or A (dot-dash) and the identifying signal, as shown on the map.

The letters "OL" designate Oklahoma City and are used in weather reports in place of the name of the city. At airports having green code beacons in addition to the rotating beacon, the designating letters are flashed by the code beacon.

Radio Facilities

THE RADIO RANGE is the most important radio aid to actual air navigation. There are two types of these aids, the large stations, usually located near terminal airports, which have an effective radius of about 100 miles, and the small "B" type radio marker stations, usually located at intermediate landing fields and in mountain passes, which have an effective radius of ten to sixty miles, depending on the requirements at each point. These range stations transmit radio signals as shown on the map on page 12. A long dash is heard on any one of the four dashes, while *n* (dash-dot) or *a* (dot-dash) is heard in the quadrants between the courses. These signals are interrupted every ten seconds to permit the transmission of the station's identifying signal.

The "A" type radio marker stations do not have range courses but transmit characteristic radio signals which identify each station; they are audible in any



THE COMBINED RADIO BROADCAST AND RADIO RANGE STATION AT SAN ANTONIO
This is one of the first stations where the two aids were combined at one station. The radio operators are now being moved to quarters at the municipal airport and the operation of the radio facilities at the station remotely controlled from their new quarters.

direction and have an effective radius of about five miles. These stations usually mark an intermediate landing field at the intersection of two radio range courses or a hazardous point on an airway.

Both the "A" and "B" type radio marker stations are equipped for two-way voice communications between ground and plane, transmitting on 278 Kc. and receiving signals from aircraft on 3105 Kc. or such frequency as may be assigned to the aircraft's transmitting set.

The radio broadcast stations are usually located near the terminal airports along the airways at intervals of not more than 200 miles. These stations transmit periodic voice broadcasts on regularly assigned Bureau of Air Commerce frequencies, ranging from 365 to 230 Kc. They broadcast general weather information near the even hour and local weather on the half hour. Since they operate on the same frequency as the associated range station at the same point, the range signals are interrupted while the broadcast is being made. These stations are also equipped for two-way voice communication between ground and plane, as are the "A" and "B" type stations.

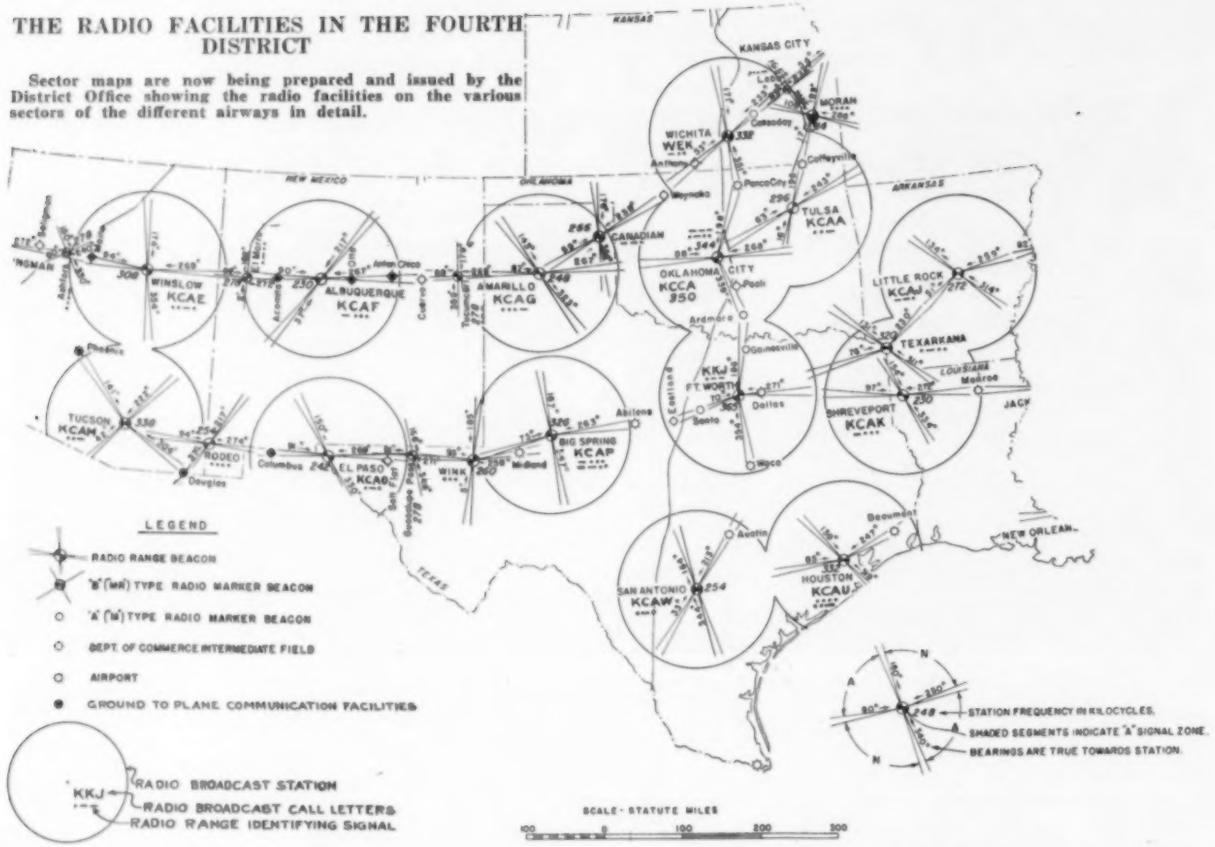
Communications

The Bureau of Air Commerce communication network covers the airways of the entire country and consists of long line teletype circuits with teletype drops at intermediate landing fields where weather reports are essential, and at terminal airports. In addition, point-to-point radio telegraph service is available between broadcast stations and "B" type radio marker stations where required. A teletype machine is in reality an electrically operated typewriter placed on an ordinary long distance telephone circuit. A message written on any machine on the circuit is automatically reproduced on all of the machines on the same circuit. As an example, there is a long line circuit between Dallas and Wichita, Kansas, with drops at Dallas, Gainesville, Ardmore, Oklahoma City, Tulsa and Wichita. A message placed on the teletype machine at any one of these points is automatically reproduced by all of the machines at the points mentioned. The long line circuits throughout the country are connected at transfer points and messages are transferred from circuit to circuit as may be required. For instance, the Wichita-Dallas circuit connects with the Kansas City-Albuquerque circuit at Wichita; messages and weather information may be rerouted over the various circuits at that point as required. This means of communication is extremely fast and accurate and requires an operator with only a typist's qualifications. However, it is dependent on existing long distance telephone lines and for this reason is not available on many of the desert or mountain sections of the Fourth District. On such sections it has been found necessary to resort to point-to-point radio telegraph, utilizing radio operators at the "A" and "B" type radio marker stations and at the radio broadcast stations. The communication system on the Southern Transcontinental Airway from Fort Worth to Phoenix is set up on this basis, with stations at Santo, Abilene, Big Spring, Wink, Guadalupe Pass, El Paso, Columbus, Rodeo, Douglas, Tucson and Phoenix. This radio circuit terminates at Ardmore, Oklahoma, where the messages are placed on the Dallas-Wichita teletype circuit and rerouted to other circuits as found necessary.

Weather Observations

Routine hourly weather observations are made by Bureau of Air Commerce personnel at a large percentage of intermediate landing fields and terminal airports in the Fourth District. Weather and upper air observations are made by the Weather Bureau at points not covered by the Bureau of Air Commerce, as well as points where special on-call weather is desired.

Reports of these observations are transmitted over the communication systems to the various radio stations and there broadcast to pilots. They are also routed to the various Weather Bureau offices for forecast and



map making purposes. The Weather Bureau offices prepare weather maps and forecasts which are again transmitted over the communication systems for dissemination to the flying public at ground stations and in the air; the maps and forecasts being posted at terminal airports and the forecasts broadcast by the radio stations. At the request of the Bureau of Air Commerce the Teletype Corporation designed machines which transmit aviation weather maps over the long line circuits. These weather maps of the United States are divided into three sections (Western, Middle and Eastern) and are prepared by the Weather Bureau offices at Oakland, Kansas City and Cleveland every four hours. They are placed on the various long line teletype circuits and reproduced and posted at terminal airports throughout the country as required to serve the flight operations at the various points.

Since pilots flying the airways are primarily interested in weather information concerning the area over which they expect to fly, the Bureau of Air Commerce concentrates its efforts in furnishing detailed information in the quickest possible time for each sector of airway, rather than burdening the communication systems and the pilot with a mass of information which he is not interested in at the time. As an example, the Fort Worth radio broadcast station, KKJ, broadcasts the hourly weather reports covering the various sectors in the vicinity of Fort Worth as follows: At five minutes to each hour, Fort Worth to Oklahoma City; at ten minutes past each hour, Dallas-Fort Worth to Shreveport and Dallas-Fort Worth to Amarillo and Dallas-Fort Worth to Little Rock; at fifteen minutes past each hour, Dallas-Fort Worth to Big Spring and Dallas-Fort Worth to Houston and San Antonio. At thirty minutes past each hour all radio stations at terminal points broadcast their local weather. Following is a sample broadcast covering the Dallas-Fort Worth to Oklahoma City sector:

"KKJ, Fort Worth, Texas, 9:50 A. M., Fort Worth, Fort Worth: Ceiling one thousand, eight hundred feet—ceiling one thousand, eight hundred feet; overcast, lower broken clouds, visibility six miles, hazy, temperature seventy, dew point sixty-three, wind northwest twelve, barometer thirty ten. Gainesville, Gainesville: Ceiling two thousand feet—ceiling two thousand feet, overcast; visibility seven miles, temperature sixty-eight, dew point sixty-two, wind north ten, barometer thirty twelve. Ardmore, Ardmore: Ceiling two thousand, five hundred feet—ceiling two thousand, five hundred feet, overcast; visibility three miles, hazy, temperature sixty-seven, dew point sixty, wind north thirteen, barometer thirty eleven. Oklahoma City, Oklahomt City: Ceiling one thousand, seven hundred feet—ceiling one thousand, seven hundred feet, overcast; visibility four miles, temperature sixty-five, dew point fifty-eight, wind northwest twenty-one, barometer twenty-nine ninety-five, severe thunderstorm approaching rapidly from northwest. KKJ, Fort Worth, Texas."

Emergency Broadcasts

The communication system and ground-to-plane broadcast facilities of the Bureau of Air Commerce are available for handling emergency messages to planes in flight or on the ground if such messages have to do with safety of air navigation. This service is generally used by transport and private operators who do not maintain their own two-way radio systems. The most frequent use is found in advising a plane of hazardous

conditions which may occur along the airway ahead of it, in which case those interested in its safety may file a message with the nearest communication station giving such advice or instructions as are deemed necessary. The message is immediately broadcast to the plane or relayed to the radio station nearest the estimated position of the plane for broadcast. Airline operators having planes equipped only with radio receiving sets often find this service invaluable during periods when weather conditions are changing rapidly, in instructing their pilots to avoid storm areas or to land at some point other than the original destination.

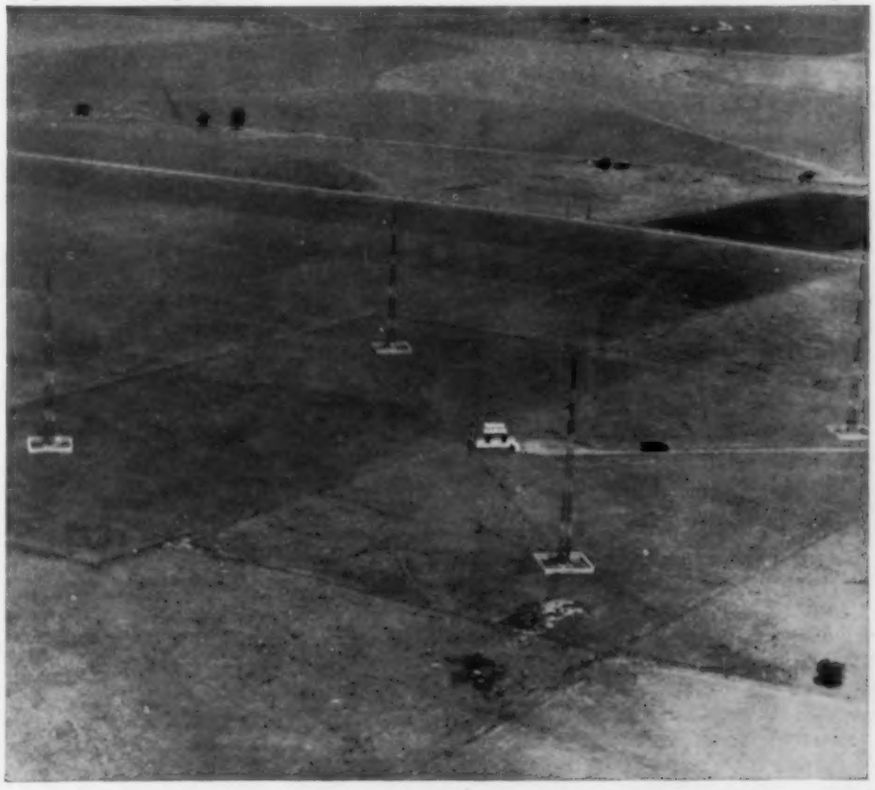
PX Dispatches

One of the very valuable services rendered private flyers and operators who do not maintain two-way radio facilities is the system of PX dispatches and reports. Before leaving on a cross-country flight a pilot may file a PX dispatch, giving his name, plane number, destination, route and information as to whether or not he desires to be "report over" by the Bureau of Air Commerce stations along the route, or, if he has two-way radio, he may wish to work these stations. This information is transmitted to stations concerned who report his passage over and landing at final destination. In event the plane is not equipped with a radio transmitter the passage over reports will be made at intermediate stations if the plane flies close enough to enable the ground personnel to recognize its markings.

In this manner those on the ground who are interested in the position and safety of the plane may be kept advised of its movements. Unfortunately, many pilots who are anxious to avail themselves of this safety device abuse the service by thoughtlessly neglecting to report their arrival at destination. This makes it necessary for the radio operator at that point to investigate and determine the whereabouts of the plane, which at large terminal cities with several airports is sometimes difficult. If the pilot happens to change his mind and land at some point other than that specified, without notifying the originally designated terminal station, it usually results in considerable anxiety and loss of valuable time on the part of the radio personnel until the plane is finally located.

Use of the Radio Range as a Homing Device

Directly above each radio range station there is a definite cone of silence wherein no radio signal is audible. In flying a course which passes directly over a station a pilot will hear the range signals rapidly increasing in volume until he reaches the cone of silence; after passing through the cone the range signals are again heard, decreasing in volume as the station is left behind. When flying over a solid overcast or through adverse weather with poor visibility, trained pilots take advantage of this peculiarity of the radio range in locating themselves and in making approaches for landing provided there is sufficient ceiling and visibility at the field to permit maneuvering and landing by sight in the normal manner. By referring to the location map of the Oklahoma City radio range on page 10, it will be seen that a pilot who is thoroughly familiar with the field, terrain and location of the radio range station, could approach on the radio range course from the west, at the proper altitude, and start a glide when the cone of silence was reached which would take him over the airport. Planes approaching Oklahoma City on any of the other three courses would swing over to the west course to make the actual approach. Considerable experimental work has been carried on



THE NEW COMBINED RADIO BROADCAST AND RADIO RANGE STATION AT FORT WORTH

The radio operators are being moved from quarters in the District Headquarters office building to quarters at the municipal field.

by the Bureau of Air Commerce utilizing this and other methods to effect blind landings under zero ceiling and visibility conditions. However, this type of flying is still in the experimental stage and is not resorted to by pilots in general except in extreme emergencies.

Maps and Airways Information

Flight maps covering the airways are published by the Department of Commerce and are available at small cost. The older maps were made in strip form covering an area of approximately 140 by 350 miles. All information necessary to air navigation is included, such as cities, towns, railroads, roads, streams, mountains, airports, fields, beacons, radio range courses and radio stations, etc. In addition special radio facility maps are compiled by each Air Navigation District furnishing all pertinent information concerning the radio aids in the district. These maps are now made in sections covering portions of the various airways.

Notices to airmen are issued by each district covering changes in the operation or condition of any aid in the district. These notices are issued in dispatch form over the communication systems and are followed by written notices. They are sent to all points which may be concerned and are posted on bulletin boards at airports and Bureau of Air Commerce or Weather Bureau airport stations. The information is also published by the Bureau of Air Commerce weekly in condensed form covering the entire country.

Supervision and Maintenance of the Radio and Communication Facilities

The District Communication Supervisor is responsible for the operation of the radio and communication aids and supervises the personnel engaged in this work. Broadcasts, teletype traffic, radio point-to-point traffic, map transmissions, etc., must be carried on at the highest degree of accuracy, precision and speed since the entire national system is interlocked and coordinated to such a degree that a minute's delay in any operation interferes with the smooth working of the entire system. In order to insure the pilot of the best and latest weather information, observations must be made, reported and routed to the proper broadcast stations and Weather Bureau offices with all possible speed and accuracy. As an example, a weather observation made at Houston at two minutes past the hour is broadcast from Fort Worth at fifteen minutes past the hour, relayed to the Kansas City Weather Bureau station, included in the four-hourly map, which is transmitted to and posted in Albuquerque and numerous other points thirty-six minutes after the observation is made. A close check is maintained on the operations of the various phases of the system by assigning certain stations the duty of monitoring and reporting on the work of other stations in the vicinity. The Communication Supervisor personally checks the operations by use of radio receivers located in his office at district headquarters and by making periodic inspections of all stations in the district in company with one of the airline inspectors. On these trips he checks the radio range courses, broadcast and two-way voice communication, using the two-way radio equipment in the inspector's plane. A landing is made at each station for the purpose of inspecting the operations, methods, etc. A further check is obtained from reports made by transport companies and individuals covering discrepancies in the service which come to their attention, such as range courses shifting out of alignment, difficulties with broadcasts, etc.

Personnel

The radio operators manning the various stations are highly trained men, who have come into the Service from commercial radio companies, the merchant marine or the military services. They are well qualified, not only in the operation of the equipment, but in its maintenance—and this is no simple matter, as anyone will realize who has had the opportunity of visiting one of the stations and seeing the mass of equipment, transmitters, receivers, meters, teletype machines and gadgets of all sorts, which are in constant use.

Airways keepers are stationed at the "A" and "B" type radio marker stations and the teletype stations located at intermediate landing fields. Most of them are experienced radio men who are in line for promotion to operators at the radio stations. They make weather operations and reports and, where two-way ground-to-plane communication facilities are installed, maintain a watch on the frequencies of the planes flying that section of airway. In addition, they maintain the field, buildings and equipment at their station. Airline pilots make a habit of calling them on each trip over as a matter of practice and training, realizing that an emergency may arise sometime when the safety of the plane will depend on perfect understanding and coordination between themselves and the keepers on duty at the stations. Ordinarily these stations are located near towns; however, there are a number of isolated stations in the Fourth District where the men find it necessary to live at the station during their twenty-day tour of duty, returning to town where their families are living for their ten-day liberty. These men get to know the pilots flying their sectors through the radio contacts and follow the progress of the planes with as much interest as those connected with the airlines. Many of them make a practice of visiting the terminal airports on their days off to get personally acquainted with the pilots and operation people.

Maintenance of the Radio and Communication Facilities

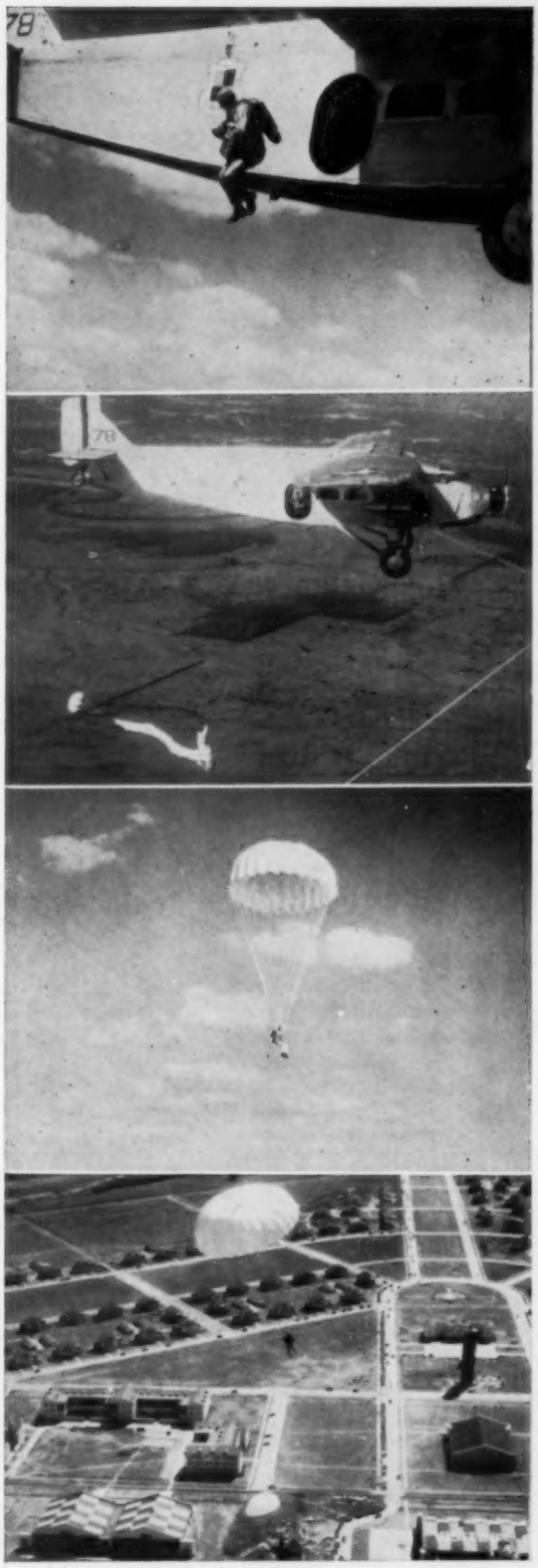
The District Communication Maintenance Supervisor and the Assistant Maintenance Supervisor make quarterly inspections of all the stations in the district for the purpose of supervising and directing maintenance procedure and methods. The district is divided into a northern and southern zone. The Supervisor inspects the northern zone one trip and the southern zone on the next, alternating with his assistant. In this manner each sees every station in the district twice a year. While at the stations the Supervisor checks the property and cost accounting records, surveys worn-out property, and supervises the inventory of all of the station's property, which is taken once a year.

The District Radio Electricians make major repairs to equipment which may be required in addition to routine maintenance, install new equipment and make such changes as may be required from time to time due to improvements in design and operation of the apparatus.

Developments and improvements are constantly be-

(Continued on page 28)

The Riggers Pull the Ripcord



U. S. ARMY PHOTO—5TH PHOTO SECTION

The four stages of the jump. Note in second photo another jumper crouched in the doorway of the transport plane.

AT BARKSDALE FIELD, the Air Corps' tactical unit near Shreveport, Louisiana, a recent parachute demonstration impressively portrayed to the pilots and personnel of the Twentieth Pursuit Group and to some 10,000 interested civilian spectators the ability and efficiency of the field's parachute department. The actual jumps on this occasion were made by eight parachute riggers picked from a list of twenty volunteers. Each rigger selected was a graduate of the Air Corps' Technical School at Chanute Field, Rantoul, Illinois.

The eight chosen riggers were divided into two groups composed of four men in each group. The first group to make the jumps bailed out of the simulated "disabled" plane in two-second intervals, as did the second group an hour later, utilizing the same parachutes employed in the first jumps.

Primarily staged as a part of the regular training program to demonstrate the efficiency of the parachute riggers, the jumps also proved the remarkably short time in which an airplane can be deserted by its human cargo. The ability of the airplane pilot to judge with precision the landing area was likewise demonstrated; each rigger, jumping from 2,200 feet in two-second intervals, landed approximately forty yards apart in the center of the landing area.

The packing of the parachutes presents a technical and specialized operation. But the riggers "know their rigging" and prove to their audience the confidence reposed in their own skill as they jump out into the ozone and float earthward by means of the 'chutes they know, care for and repack.

The accompanying photographs, snapped during the recent jumps by members of the Fifth Photo Section at Barksdale Field, clearly show the various stages of the jumps. As the jumper leaves the plane, his hand is ready to pull the ripcord when sufficient clearance from the plane is effected. After the cord is pulled, the small auxiliary 'chute (the pilot parachute) opens and pulls the main canopy out of its pack. Rapidly, the main chute opens and the ordinary descent is safely made.

Parachute jumping is apparently no less a science or art than any other phase of military flying. The education of men in the care and usage of 'chutes represents an integral part of the associated elements of our military flying. The present-day training and utilization of parachutes puts to shame the methods in the earlier days when the lack of proper equipment and scientific knowledge precluded the practical usage of 'chutes in many instances of emergency. Today, the proper servicing and rigging commands particular notice in that parachutes are regular equipment in the Air Corps.

Just as important as proper education in and the practical application of parachutes is inculcating of utmost confidence on the part of pilots in the great silken canopies. When an emergency demands the use of the parachute, there must be no delay in "bailing out." The entire operation must function smoothly, safely and with utmost speed as was demonstrated in the recent Barksdale Field program.

Inspection of Aircraft

Part IV—WINGS: Their Structure and Rigging

By REAGAN C. STUNKEL

IN THE previous installments of this treatise, we have undertaken the inspection of motor installations, fuselages, controls, empennages and landing gears together with their various components. We are now ready for the consideration of the wings, their rigging, methods of attachment, covering and structure. There are many helpful suggestions necessary for the routine inspection of these components of the wing.

There are wings of every conceivable type and structure now in general use; consequently we must begin by classifying the various types with a separate consideration of each type. Wings are covered with either fabric, metal or wood. All types of covering are popular and each boasts of some particular advantage. Wings are braced to the main structure of the airplane either externally or internally and all three methods of covering are used on wings braced in either manner.

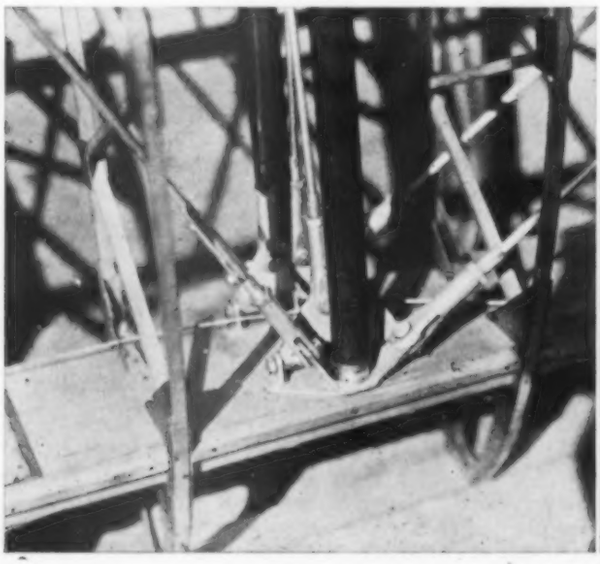
Fabric Covered Wings

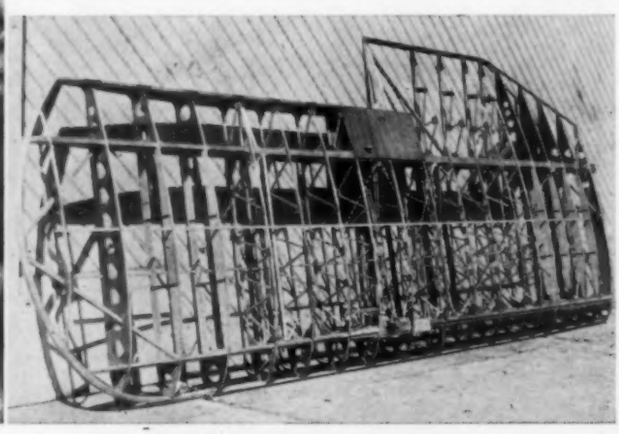
AIRPLANES depending upon external rigging for the structural bracing of the wings are almost without exception of the type wing covered with fabric. First of all the inspection plates should be removed from the various important parts of the structure to facilitate examination of the fittings and moving parts. Since the advent of flaps, slots, servo controls and retracting undercarriages, the wing has become the location of a large amount of mechanism. The inspector may begin his examination at the fuselage, checking one side at a time. The first object of his scrutiny should be the wing attachment fittings. These fittings must be rigidly attached to the spar and free from any evidence of cracks or distortion. Bolts attaching the wing fitting to the fuselage fitting may be tested for tightness, and the condition of the safetying device determined. While the wing attachment fitting is being examined, it is well to examine the brace wire anchor fittings because of their usual proximity to each other.

Brace wire terminal ends should be securely locked in place and the clevis pin or bolt fastening the fitting to the terminal end safetied and a snug fit in the hole. There must be no sharp bends or deep nicks in the streamline wires; they should line up with the airstream. The wire should have the proper protection from the weather. Wires not plated to prevent deterioration should be oiled regularly or coated with prussian blue.

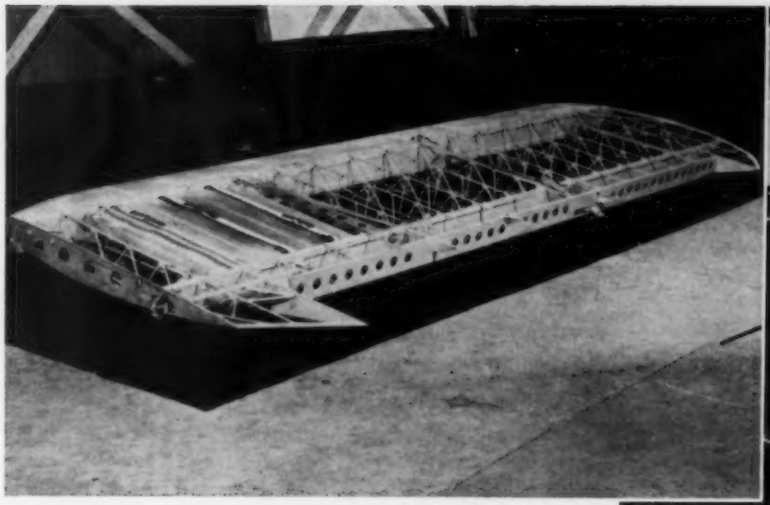
In checking wires for the proper tension, the inspector must rely on his own experience. No wire must be so tight that the structure of which it is a part becomes subjected to undue stresses. However, a wire should not be loose enough to allow flexibility in the truss. It should be borne in mind that while on the ground, the weight of the wings is imposed on the landing wire, and the impression might be gained that the flying wires are unduly loose. Should any wire be discovered excessively loose, it should not be readjusted until the definite cause for the condition is determined. Center section wires often develop looseness as a resul of unusual loads applied in hard landings.

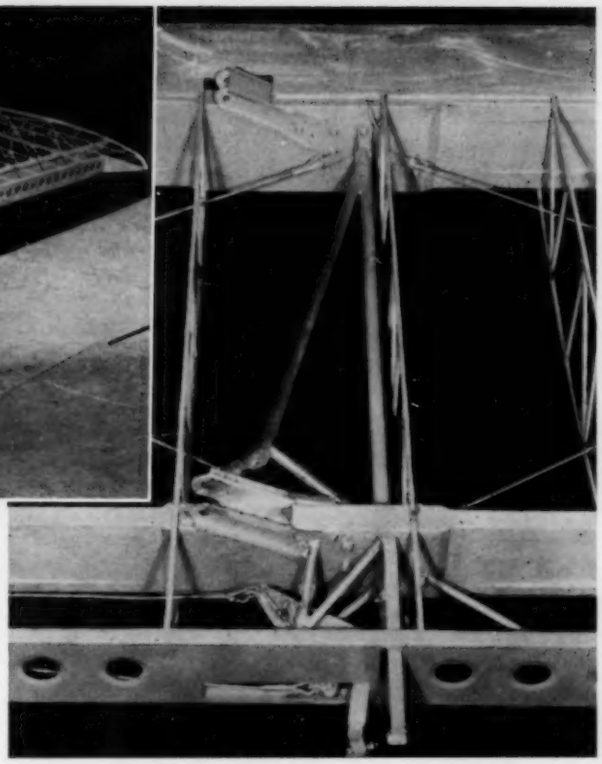
The inspector should sight along the leading edge of the wing for evidence of distortion on the surface. There have been cases of wires being tightened to





Detail view of Waco Wing construction. Left: The compression member and drag bracing tie rods and terminal fittings. Note that the usual diagonal welded member in the compression member is supplanted by diagonal tie rods. Below: The complete wing showing ribs, spars, bracing, compression members and interplane strut fittings.





Above: Photo showing general construction of Stinson Clark Y Wing for SR-5 Reliant Airplane.

Right: Close-up view of Clark Y Wing section showing compression strut and lift strut plate fittings at spars, also drag rods and dural ribs, aileron control mechanism. Note extensive use of dural in construction of this fabric covered wing.

such an extent that the wing assumed a slight bow in the center. Struts must also be examined for this condition. Center section struts sometimes become bowed on account of excessive landing loads. There are occasions when a condition just mentioned is overlooked, —the wires are tightened and the ship is permitted to fly until the wires again become loose, or a strut buckles completely under the load. Such difficulties can be avoided by an intelligent, careful inspection.

While the inner portion of the wing is being inspected, the gas tank covers should be removed and the tank supports and insulation examined. Gas lines from the wings to the fuselage should have the proper flexible connections. There are some airplanes which are not provided with the proper means for the inspection of gasoline tank supports in the wing; the inspector must be content with observation of features of the installation visible from the outside.

The fabric should be in good condition, of course, and particular note should be given the condition of the fabric around the gasoline tank filler caps because of the deteriorative effect aviation gasoline has on the finish. Any semblance of the distortion or loosening of the covering of the wing should have immediate investigation to determine the cause of the condition. Stitches holding the covering to the ribs of the wing often break or loosen, permitting the fabric to balloon away from the rib in flight. This may be repaired by removing the tape covering the stitches and by replacement of the stitches. Trailing edge ribs that become loose or broken may be located by gently working the trailing edge of the wing in a vertical direction.

Removal of the inspection covers at the internal compression member stations throughout the wing will allow the inspection of the internal tie rod fastenings, as well as the joints between the compression ribs and the spar. Detail of a construction of this type may be obtained by observing the accompanying photograph of the Stinson Reliant wing, uncovered. Another point of inspection should be the aileron control bellcranks and cables, clearly illustrated in the photograph. No slack should prevail in this fitting or in the control wires. Brackets or hinges which hold the aileron to the wing and all similar fittings retaining the hinges which support the landing flaps should be tight on the spar of the wing.

Cantilever Wings

THERE is far less detail in the inspection of the cantilever wing. Because of the stresses applied to the covering, minute attention must be given this item. In the cantilever wings covered with wood, the necessary of a close inspection of the wood is obvious. Small cracks in the covering begin behind the spars and develop parallel to the spar unless checked by the repair of the fracture. Plywood often becomes loosened from the stringers bracing the skin against buckling and fluttering and must be fastened down either by nailing or with small screws. Any wood structure must be properly protected against deterioration from the weather. Cracks in the paint on the wooden surface of the wing should be immediately eliminated to prevent moisture from accumulating beneath the surface of the protective coating. On some wings the wood is attached in the form of shingles, overlapping one another, and nailed to the main structure. The inspector should devote particular attention to the con-

(Continued on page 30)

WASHINGTON

P. T. NORTON, JR.

The Baker Board Report

AS WE READ THE CONCLUSIONS and recommendations of the committee which has just completed a comprehensive study of aviation as an agency of National Defense, we are impressed by the competency of its members for the assignment given them by the Secretary of War with Presidential approval.

The Baker Board proposes 2,320 planes for the Air Corps. It vehemently requests 820 more airplanes and advises a substantial increase in personnel. Army control is defended; Major James H. Doolittle's was the only signature on the minority statement recommending Air Corps divorcement from the ground army and its establishment as an independent arm.

A rejuvenated leadership is suggested; retention of General Staff control is urged. Notable in the report is the reversal of attitude by Major General B. D. Foulois, Chief of the Air Corps, who now agrees to this latter provision. Summing up the general aviation affairs of the country the Army officers and civilians conclude as follows:

"In general aviation in the United States leads the world; it is superior in commercial aviation; its naval aviation is stronger than that of any other power, and with more financial support its Army aviation can be raised to a position equal to that held by the Navy."

Throughout 75 pages of detailed analysis, supplemented by citations, the conclusions of the committee quash the demands for independent air power; demand the increase of the number of planes from 1,500 to 2,320; the increase of officer and enlisted personnel to man the added equipment; establishment of the Chief of the Air Corps as an administrative and procurement officer not charged with command of the combat force, but strictly as head of the business and financial phases of the Corps' extensive operations; selection and retirement of Air Corps officers as in the Army, the Navy and Marine Corps; education of Air Corps officers and ground officers in each phase of military science in order that, as in the Navy, they may be able to function as higher commanders in any branch.

These foregoing major recommendations are bolstered with an emphatic suggestion that definite decisions be made immediately to remove all uncertainty as to the future national defense position of the Army Air Corps.

The report reads:

"The Morale of the Army as a whole is affected by stagnation in promotion and the effect of the "hump," as well as by shortage of equipment.

"The air soldier alleges failure on the part of the ground soldier to understand the problems of aviation while the ground soldier reflects the view that the air soldier avoids cooperation, seeking only independence of action and promotion.

"Testimony to that effect convinces the committee of the necessity of effective steps to instill in both the ground and the air soldier a realization of their joint and cooperative missions.

Definite decision as to the future place of the Air Corps in the Army, coupled with leadership thoroughly in accord with such decision, would insure the desired results.."

The committee enthusiastically indorsed continuance of the 1926 aircraft procurement act which was suggested by the Morrow Board. It is held that the Government should refrain from competition with private aircraft industry, and further that the Government should pay the full cost of experimental designs made at its suggestion. The Army's flying the Air Mail was "invaluable experience," according to the report. Tables were set forth to show how the flyers responded with "soldierly courage" to a demand made doubly difficult to meet because of weather conditions, lack of special training and inadequate equipment.

The full membership of the Baker Board includes: Former Secretary of War Newton Diehl Baker, Chairman; Major General Hugh A. Drum, Deputy Chief of Staff; Major General Benjamin D. Foulois, Chief of the Air Corps; Karl T. Compton, President of Massachusetts Institute of Technology; Brigadier General C. E. Kilbourne, Chief of the War Plans Division, General Staff; George W. Lewis, a member of the National Advisory Committee for Aeronautics since 1919; James H. Doolittle, former Air Corps Officer, distinguished aviator in both military and civilian aeronautics; Edgar S. Gorrell, who formulated the basic principles for expansion of twenty-four aviators in 1917 to the force which the United States created for the World War; Clarence D. Chamberlin, war aviator and famous trans-Atlantic flyer, engineer and inventor; Major General George S. Simonds, Chief of the Army War College; and Major Albert E. Brown, recorder for the Board.

The Federal Aviation Commission

THE LONG HERALDED AVIATION COMMISSION, whose establishment was requested by the President and authorized by the new Air Mail Law, is now a reality. It has set to work on its tremendous assignment under the chairmanship of Clark Howell, Atlanta publisher.

Sworn in with the chairman were Franklin K. Lane Jr., Edward P. Warner, Colonel J. Carroll Cone and Albert J. Berres. One of the appointees, Jerome C. Hunsaker, was not present at the White House meeting of July 10th. His appointment came while he was on a tour of Europe. He will return shortly to Washington, to take the oath of office.

Every phase of our national aviation is to be studied. Hearings will start early in September in Washington. In the meantime, studies will be made of the domestic situation and of foreign aviation policy as well in an attempt to profit by other nation's experience. An attempt will be made to incorporate into Federal policy the successful policies of other nations.

It is significant to note that the Federal Aviation Commission is the fifth body of men appointed by the present administration, and the fifteenth since the War for the investigation and study of aviation.

Particularly encouraging to the industry and to all aeronauts is the fact that the new Commission has no preconcieved convictions, no political inhibitions, no connection with any organization nor an affiliation with any governmental agency or department. The inquiry is primarily in search of constructive measures in order that recommendations can be made to the next Congress (no later than Feburary, 1935) for legislation resulting in a broad Federal policy conducive to world supremacy in aeronautical development.

Chairman Newton D. Baker of the Baker Board, which has to Chairman Howell just tendered its report to Secretary of War Dern, suggested a foreign tour for the sake of observation and perspective. The new Commission will review the Baker report in its study of Military Aviation, and will probably be guided largely by its findings.

$75,000 has been authorized to carry on the work of the Commission. No such sweeping constructive inquiry has ever before been undertaken by our government in its many attempts to find the best methods of encouraging aeronautical development.

Low Cost Plane Eventually Assured

THE BUREAU OF AIR COMMERCE announces the creation of a Development Section to specialize on the development of a low priced airplane that will be safe and easy to operate for general public use.

The Department of Commerce feels that in the past it has spent many millions of dollars on aids to air navigation and air regulatory work but has contributed little towards increasing the safety of the airplane.

Eugene Vidal, therefore, in keeping with his untiring efforts towards his favorite air project announces the creation of the Development Section to foster and promote what has been officially announced as "safer flying equipment."

During the closing days of the 73rd Congress, one million dollars was appropriated by the President to be used in connection with the further development of civil and military aviation. At the same time, authority was given the Department of Commerce for its program of development. $100,000 of the appropriation has been allocated to the Department for its work.

In direct contrast with the rapid growth and development of scheduled airline systems of the United States, the private use of aircraft has been alarmingly retrogressing and there has been a decided lag in development work on equipment intended for the average person.

Sufficient fundamental knowledge is now available to improve materially the safety of private flying and it is the intention of the Bureau of Air Commerce to assist the industry where possible in the application of those principles to the production of airplanes for the average citizen who wishes to fly, but who has neither the time nor the desire to become an expert pilot.

The new Development Section will take over the supervision of the acquisition by the Air Commerce Bureau of the twenty-five small, two seated, inexpensive airplanes to be used by the Bureau's inspectors, for which bids will be opened on August 27th. So with the $100,000 to spend, the Department of Commerce can officially announce its thorough plans for the development of the "Poor Man's Plane."

John H. Giesse, who will be chief of the new Development Section, has seventeen years of varied experience in commercial, Army and Navy aviation. He is a post graduate in aeronautical engineering and has held many responsible posts, including his present position as Chief of the Manufacturing Inspection Service, Bureau of Air Commirce.

Approved Tunnel to Test Speeds of 500 M. P. H.

THE PUBLIC WORKS ADMINISTRATION has set aside a fund of $475,300 to be made availiable for National Advisory Committee for Aeronautics venture into high speed tests. The tunnel which is to be constructed at Langley Field, Va., will develop a wind speed of 500 m. p. h. The research made possible by this device will aid in attaining high airplane speeds with safety. Authorization for the fund has been received from Secretary Ickes.

Backed by Secretary Dern, Swanson and Roper, the project has been called the "greatest need for aviation today."

"Research indicates that airplane speed upward of 500 m. p. h. is attainable," committee officials said, "but knowledge is lacking as to the natural laws governing air flow above 200 miles per hour, and consequently higher speeds cannot be used with safety."

Built of reinforced concrete with steel plates lining the walls, the wind tunnel will be constructed within the year at the laboratories of the NACA at Langley Field, Va. Its air flow of 500 m. p. h. will go through a test chamber 8 feet in diameter. Eight thousand horse power will be required to attain this wind speed through the tunnel. Dimensions will be 154 by 21 by 25 feet high.

A. C. C. Moves to Washington

THE AERONAUTICAL CHAMBER OF COMMERCE of America, trade organization for the aviation industry in the United States, will move its executive of-

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Aircraft 1934

Left: The new Bellanca Aircruiser Seaplane, a recent development of the Bellanca factory at New Castle, Delaware. Right: The first Ryan S-T Monoplane marks Claude Ryan's re-entry into aircraft manufacture.

Bellanca Aircruiser Seaplane

THE Bellanca Aircraft Corporation recently delivered the first of its huge Aircruiser Seaplane Transports, which is now in service over the New York and Suburban Airlines, Inc., a subsidiary of the National Aviation Corporation. It will be used throughout the summer on the seaplane commuter service established from Manhattan Island to Long Island points. The Aircruiser Seaplane transport marks a new field of development for its manufacturer.

Identified as "the World's Fastest 715 H. P. Fourteen-Passenger Seaplane," the Aircruiser will perhaps find wide usage and acceptance along the nation's coast lines. Its utility is further evidenced by the fact that it can be readily converted to landplane use by the removal of the twin floats and the substitution of conventional wheel-type landing gear. Amphibian features can be provided, having the standard twin-float seaplane undercarriage, plus a retractable land undercarriage which folds completely into the lower stub wings. It will be recalled that Bellanca pioneered in this type of retracting landing gear as early as 1927.

The huge twin-float seaplane is powered with a single Wright "Cyclone" 1820-F geared engine of 715 horsepower. Its maximum speed is 160 miles per hour; it cruises at 145 miles per hour, approximating the performance of the same model Bellanca landplane.

Many interesting service and maintenance features include the stowing of the anchor and rope in the large streamlined float strut cuffs, as well as provisions for attachment of outboard motor for ease of taxying close to shore.

The development of this efficient, fast, sturdy seaplane type opens up an entirely new field for transport operations. Many large maritime cities are more accessible through their seaports than through the present flying field facilities, which are located long distances from the metropolitan centers.

The Aircruiser Seaplane is offered in a twin-engined version which will give more outstanding performance in speed and load carrying capacity than the single powered model.

The Ryan S-T Monoplane

FULL Department of Commerce approval has been granted the Ryan Aeronautical Company at San Diego for its new Ryan S-T monoplane powered with either the 95 or the 125 horsepower Menasco engine. This new type of high performance, low wing, all metal fuselage ship is credited with a cruising speed of 120 miles per hour and a top speed of 142 miles per hour with the 95 horsepower installation, while the 125 horsepower motor gives an actual cruising speed of 132 miles per hour or 152 miles per hour with full throttle.

Claude Ryan, President of the Ryan Aeronautical Company and founder of the Ryan Airlines which in 1927 built Col. Lindbergh's famous "Spirit of St. Louis," makes his re-entry into manufacturing with a plane which he believes will adequately meet the demands of the sportsman pilot or operator of lighter commercial equipment.

Outstanding features which the manufacturers have incorporated as standard in the Ryan S-T, for the first time in a medium sized plane, include the all-metal fuselage, wing flaps or air brakes and new tab controls to replace the older type of stabilizer adjustment. The plane is fully streamlined with wheel pants, fairing and wing fillets. The two single cockpits are tandem to give greater efficiency. With this arrangement the front cockpit can be covered to serve as special luggage compartment and also to give the sportsman pilot a plane with clean fast lines in keeping with its performance. The excellent visibility from both front and rear cockpits, together with the slow landing speed of 38 miles per hour which is possible with the air brakes, makes the plane well suited for student training purposes.

Immediate production schedules on the new ship are being rushed by the Ryan Company at its Lindbergh Field factory in San Diego.

Following on the heels of the Department of Commerce approval, the sales department chalked up immediately the sale of the first two ships and announced an influx of daily inquiries that would undoubtedly

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The Professional Air

Demand for Thoroughly Trained Men Responsible for Establishment and Popularity of Executive Transport Courses in our American Air Colleges

COMMERCIAL AVIATION increases its demand for graduates of accredited air colleges—graduates who have been thoroughly trained in the professional aspects of the industry as well as being transport pilots of exceptional ability. In the past few years particular attention has been directed to these young graduates who are launching out into the profession of aeronautics, equipped with a rigid course composed of various associate arts and sciences of aeronautics and with a stable background in and proper perspective of the financial and business side of the industry.

As in other professions, there is little chance for advancement or valuable service when one's knowledge is narrowly limited to one particular phase of the broader subject. In other words, one must be decidedly more than just a good pilot. He must, in addition, be trained in radio, in maintenance, in aerodynamics, in economics and psychology, in aircraft design, in operations and in the financial and legal aspects of the business. Just as the brain specialist must have a fundamental knowledge and training in all phases of medicine, so must the professional pilot of today be well informed in all phases of commercial aviation. With the constantly increasing demand for these highly trained men comes a rise in the barometer of popular demand for the executive transport courses in our nation's finest air colleges.

Side by Side Dual Controlled Waco Cabin Training Plane. One of the Many Types of Planes Used to Give the Graduate Diversified Experience in Every Type of Modern Aircraft.

An outstanding example of this demand for the professional aspect in training and education may be found in figures recently released by Parks Air College: Forty graduates in the executive transport course and other advanced courses have been absorbed by commercial aviation within the past forty-five days! These figures are exemplary of all our institutions of higher learning in aeronautics. Logical deduction No. 1 is that the definite trend of pilot instruction is towards the professional schools for aeronautics just as there have been for centuries in law, in medicine, in finance and business administration; nor is it unlikely to believe that our aeronautical universities, so to speak, will some day parallel the importance of the institutions dedicated to the training of men in the older professions.

Action Photo Showing Student Actually Landing Plane Completely Blind. Note Safety Pilot in Front Cockpit with Hands Above His Head to Indicate that He Is Not Aiding Student to Land.

The inevitable development of aviation as the major factor of future transportation, which has never been more evident than at the present time, further augments our deduction. No stone is being left unturned by private enterprise in aviation and governmental agencies to hasten and encourage future growth and development. The demand for properly trained men will rise in proportion with the inevitable growth, and

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Aerial View of Crowd Attending Flight Demonstration at Parks Air College.

"Not Too Technical"

The Shifting of Center of Pressure on the Airfoil and its Control for Lateral Stability

BY GEORGE CARROLL

DURING our former treatment of wings, we were concerned primarily with the nature of airflow about the wings when the plane was being forced through the air at sufficient speed to produce lift. We delved into the nature of the lifting force and the action of the air about the wing's tips.

We shall notice in this discussion, after proper consideration of the accompanying diagrams, where the lifting force centralizes, the manner in which it shifts or travels, and the cause and results of lift center in its variable positions.

First, we must note that a wing in level flight has a portion upon which the pressure is centralized—an area where the center of lift predominates. Ordinarily this centralized point is approximately 30% to 35% of the chord. At different angles of attack or incidence we find that this center of pressure varies; it shifts from one position to another, depending upon the angle the plane is climbing or descending, and we term this change of position as *center of pressure travel*. Let us consider a plane in a climb—at a high angle of attack: the travel of the center of pressure is caused by the air banking up on the under surface of the wing. The wing presents a partially flat surface to the airflow, and the "cupping" of the air beneath the wing forces the center of pressure to move considerably forward from its position in level flight, or nearer to the wing's leading edge. Likewise, in descent, or at a negative angle of attack, the center of pressure travels towards the trailing edge. In this position it is evident that the air more freely "spills out" from the under side of the wing.

It has been learned that this center of pressure travels as much as 15% or 20% of the wing chord, forward or backward on the under surface of the wing; thus it is easy to understand how unstable moments are capable of taking place when the line of flight is changed. The center of pressure travel will permit a plane to become very nose-heavy or very tail-heavy, depending upon the change in the angle of flight.

In Fig. 1 a wing section is illustrated to denote a wing in level flight. The vertical line CP represents the center of pressure, located, let us say, at approximately 32% of the chord.

In Fig. 2 the same wing section is illustrated at an increased angle of attack. Note that the center of pressure has traveled forward to approximately 28% of the chord. Here the lifting force applied on the wing has shifted nearer the leading edge because the air tends to bank up on the wing's under surface. In other words, the compressed region takes place forward of the line in Fig. 1 since it can not escape so readily from under the wing.

Fig. 3 illustrates the same wing section at a negative angle of attack. Note the center of pressure in this instance has shifted nearer the trailing edge of the wing. The vertical line, marked CP, takes up the position of approximately 50% of the chord.

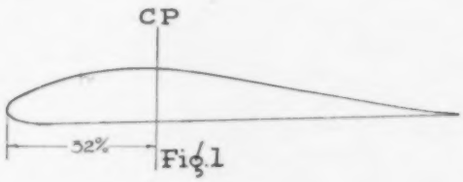

Fig. 1

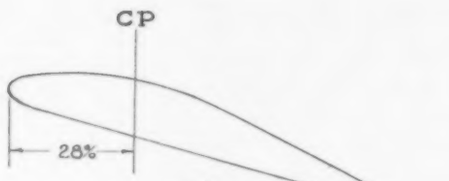

Fig. 2

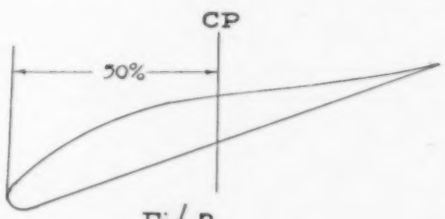

Fig. 3

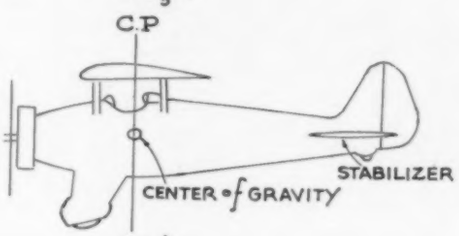

Fig. 4

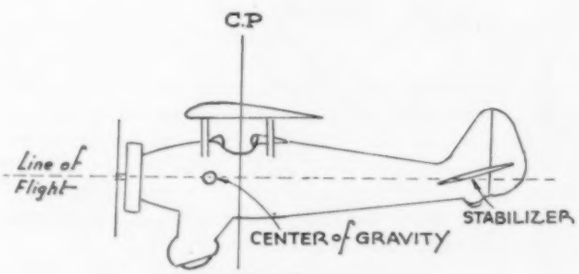

Fig. 5

Fig. 4 shows an airplane in level flight with the center of gravity, CG, located directly beneath the center of pressure on the wing, which in turn is marked

CP. In this instance, there is as much weight forward of the center of pressure of the wing as there is to the rear of the center of pressure. The plane is therefore balanced, or pivoted directly on the center of pressure. This condition will remain as illustrated until the plane is disturbed by exterior influences such as "rough air," which would force the airplane into a different angle of attack.

What would take place if the ship were suddenly placed at a great angle of attack by a sudden barrage of rising air currents, much the same as the position of the wing illustrated in Fig. 2? We have noted how the center of pressure moves forward on the wing; we see in this instance how the greater portion of the ship's weight would be to the rear of the center of pressure line, throwing the center of pressure line forward of the ship's center of gravity and thereby resulting in tail heaviness—a condition which must be counteracted by the controls.

In Fig. 5 we see illustrated a plane wherein the controls come into play. It is designed to practically take care of the varying conditions such as the shifting of the center of pressue line from the center of gravity by the utilization of one certain built-in feature—the stabilizer, which is shown in the figure. A stabilizer is a horizontal plane built on the body or fuselage of the airplane, quite similar in design to the wing; its area is roughly 15% of the wing area. The area of the stabilizer depends largely upon the length of the fuselage—the longer the fuselage, the smaller stabilizer needed for the fuselage actually acts as a leverage.

It is evident from an understanding of Fig. 5 that the stabilizer assumes a negative angle and thereby produces a slight but effective pressure on its upper surface. In respect to the line of flight the leading edge is lower than its trailing edge. In this negative angle position it is readily seen how it is capable of forcing the nose of the ship upward and the tail downward, using the center of pressure of the wing as a pivot. This pressure is adjusted by will in moving the stabilizer; in this case it is moved to bring about a balanced condition. The pressure is absolutely controlled by means of the stabilizer adjustment.

If the plane in Fig. 5 was conversely in a negative angle of attack, the nose heaviness caused by the center of pressure shifting to the rear would be overcome by the same negative pressure building up on the stabilizer.

The stabilizer has desirable features other than an aid to lateral balance. If the ship were pulled up into an extremely high angle of attack position and permitted to reach the point where the lift ceased to function, it would drop immediately on account of the extreme weight forward of the center of pressure. As the speed increased as the nose continued to drop until flying speed is attained, it is evident that the stabilizer comes into play again, righting the plane to an even keel. The plane is therefore automatically balanced by the stabilizer since the pressure in opposition to that of the pressure acting on the wing surface permits the center of pressure to regain balance with the center of gravity.

The ideal illustration fully demonstrates the action of the stabilizer is found in pulling a plane up into a stalling position. Because of the overbalanced condition, the nose falls off. Sufficient speed is soon regained and permits a counterbalancing pressure to build up on the stabilizer surface, effecting level flying position. If the power which propels the plane is off, the plane will start falling again until the increased speed permits the stabilizer to act as before. This assistance ideally illustrates how the action of the stabilizer performs one of the most integral duties of the controls.

In summary, it is important to thoroughly comprehend the relationship of the center of pressure of lift to the chord of the wing, and the relationship of the center of pressure to the center of gravity. Too, the phenomena of the shifting characteristics of the center of pressure on the wing according to the angle of attack must be appreciated. Finally, the manner in which the stabilizer comes into play in controlling and effecting desired flying positions is requisite in our not-too-technical study of aerodynamics.

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Federal Aviation Commission

(Continued from page 9)

of Bell Telephone Laboratories where he developed wire and radio services during the period from 1926 to 1928.

He has been Vice President of the Goodyear-Zeppelin Transport Company and Vice-President of the International Zeppelin Transport Corporation. Member of the Joint Army and Navy Technical Commission from 1917-1918. Inter-Allied Armistice Commission 1918, National Advisory Committee for Aeronautics 1923. He is a fellow of the American Physical Society and Honorary Fellow of the Royal Aeronautic Society of Great Britain. He is a member of the American Society of Naval Architects and Society of Automotive Engineers. He was awarded the United States Navy Cross.

A. J. Berres

A. J. Berres was born in Washington, D. C. and has lived there all his life until 1927. For twenty years he was Secretary-Treasurer of the Metal Trades Department of the American Federation of Labor. During the War he represented Labor on the Shipbuilding Labor Adjustment Board, commonly known as the Macy Board, for the entire United States. Subsequently he was appointed by the then Assistant Secretary of the Navy, Franklin Delano Roosevelt, as a member of the Departmental Wage Board of Review. This Board finally fixed rates of wages for all navy yard and naval station employees throughout the United States. Since 1927 he has been representing the motion picture producers in all labor matters affecting the employees of the motion picture industry. This position he held until appointed by the President as a member of the Federal Aviation Commission.

Franklin K. Lane, Jr.

Franklin K. Lane, Jr. is a California Attorney and son of the former Secretary of the Interior, Franklin K. Lane, Sr. He had extensive experience as a world war flier. His first hand experience with the war-time Air Corps will give him a valuable insight into future national Air Defense needs—and in his capacity as an attorney, he will in all probability draft the final report to be made to Congress for the Commission.

Ports of Call

Chanute, Kansas

O. E. DICKERHOOF has purchased a J-6-7 Monocoach from DR. POWELL of Lawrence. Dick and JIMMY BAKER flew to Syracuse and installed a new cylinder head and brought the ship back to Chanute, where it will be used in charter and express work. They made the trip in Dick's Travelair and NORMAN KRAMER flew it back.

MERLE SMITH bought the OX Travelair from Dick, after selling his Waco to MR. KENTRILL of Yates Center. Smitty also sold his Travelair at Winfield to NEAL SAVOY of the same city. Neal had a little hard luck when a windstorm blew the hangar down and did considerable damage to the ship.

W. P. HOUSTON, theater owner of Chanute and Wichita, has purchased a Boeing 40-B-5 from the Stearman factory at Wichita. This is his second ship, the first a Lycoming Stinson. W. P. has a private license.

DICK and FRED BRADLEY made a recent trip to Guthrie, Oklahoma, and flew a Warner Robin back to Chanute to be recovered and the motor gone over. The ship belongs to IRA GUIER, a Santa Fe man, of Guthrie.

WALLACE HANSON finds his Monocoupe very handy in commuting to and from his oil well work at Fredonia, enabling him to be with MRS. HANSON, who is recuperating from a recent operation at the Johnson Hospital.

CWA improvements are progressing rapidly under DICK'S direction. The northeast corner has been leveled and tiled and the boundary lights are being moved so that soon the entire field will be available. Other finished work includes an extension to the hangar apron, new fence, and a new coat of paint for all the buildings and equipment.

Business was good the Fourth of July. DICK, with his Monocoach and Cessna, DON INMAN with his Stinson, and MERLE SMITH with his Waco were busy till late at night carrying passengers. Over 200 persons took advantage of the special rates for the day and enjoyed a trip through the air. During the morning Smitty and CARL HALL flew to Pittsburg, where Carl made a double 'chute jump and Smitty stunted. Carl jumped again that afternoon over the Fair Grounds at Chanute.

Here and There—The INMAN BROTHERS are barnstorming through this part with their Ford and Stinson. They hail from Coffeyville. . . . LAWRENCE MILES, Independence, made a recent trip to Kay See after serum to combat a case of dysentery. In spite of the best of care the baby passed away a few days later. . . . BEAL ROBINSON and DON GOFF, Independence, are rebuilding Don's Kari-Keen and expect to start on Beal's Barling as soon as they finish the other ship. . . . FREDONIA has a real nice airport, although a little small. It is a result of CWA work and is kept in excellent condition. It was equipped with boundary lights and a tower for a rotary beacon soon to be installed. DR. ERVAY is the only ship owner there at present. He has a Cavalier. The INDEPENDENCE AIRPORT is for sale by a private owner. Two airplanes are included. . . . CWA work has aided PITTSBURG in improving its port. Grading and leveling has made the entire field available. E. H. MCFARLAND and LOUIS W. WATSON are two operators there. . . . MONTY BARNES, Wichita, stopped off at Chanute to gas his Aeronca, which he purchased in Toledo, Ohio.

Fort Worth, Texas

JIMMY MATTERN, the home town boy who made good, is back in Fort Worth but this time only to include it among the favored cities he is visiting on his thirty-two-State tour for the Pure Oil Company. Jimmy's home is really in SAN ANGELO, but he spent so many years here at Meacham Field that we feel we have a claim on him. While here he was entertained by H. S. JONES, the man who helped map his course for him, and they showed the pictures made on both of his attempts to circle the globe.

LT. SWEETIE DAVIS and LT. JAY GENTRY of Barksdale Field flew in for an overnight visit in two of the new Boeing P-26's the Army has just added to its equipment.

MR. DAVID TRAMMELL, prominent Fort Worth lawyer, is wearing out the airways attending to his far-reaching business all over Texas. He flies a J-5 Stinson.

JIMMY MAR, Chinese student pilot, who now holds a private license, is seen at the airport every morning adding to his more than 100 hours, aiming at his transport. Jimmy's plans for the future he keeps to himself, but he says that China is included among them.

REG ROBBINS has recently completed his neat little Hisso-powered racer and received a Department of Commerce NR license on it. He has just replaced the original home-made wires with a complete set of Mac-Whyte wires—so, he says, he can do anything in it that strikes his fancy. He is rather secretive about his plans for it but at the present seems satisfied to put on his own private races. He says he is sure of winning those.

CRATON GUTHRIE last week got his transport license in the American Eagle of his instructor, ED RITCHEY. MR. RUSS DELANEY interrupted his vacation, which he is spending in training at Hensley Field, to give him the test. Now all Craton needs is a job so he can use that much prized license.

FRED L. CRAIG, salesman for this district for the Gulf Oil Company, represents the modern young business man. He is taking up aviation in a very serious way in the hope of being of more service to his company. He soloed in two hours, fifteen minutes. MR. GARDNER, formerly with the Department of Commerce, flies a new Lycoming Stinson for the same company.

Sinclair is not to be left out among the oil companies having flying representatives. GLEN HARROUN is having a cabin put in the front of his Lockheed Orion which he flies for that company. Bowen shops are doing the job.

Joplin, Missouri

During the warm Summer weeks, BYRON MCCARTNEY, with BILL and HOMER JOHN, are overhauling their Penguin on the Waco 10 and the Seamens Travelair in those cool tin hangars on the Joplin 'port.

EARL ROLLAND was a-visiting the 18th with the Springfield Stinson and a most charming lady passenger.

An Army Douglas dropped in recently from Fort Riley, Kansas, and the brains of the outfit was in such a hurry to get a drink of Joplin beer that the airport manager didn't even get their names.

The Curtis-Wright Junior has just been bought by MR. HARPER of Carthage.

CLYDE THOMAS landed in a field not long ago at a friend's home near Joplin. The field turned out to be full of oats three feet high, instead of a bare pasture as last year. Good luck for the owner of the field, as Clyde threshed the oats. Clyde and his airplane came to a gentle stop in an inverted position. No one was injured, but the plane suffered a bent prop, a broken front wing spar, and a slightly bent fin and rudder. BOB MCCRUM is repairing the damage and hopes to have the ship in shape soon.

Kansas City, Missouri

E. E. PORTERFIELD, who was president and active head of the old American Eagle Aircraft Corporation, is returning to the aviation "game" as head of the Porterfield Aircraft Corporation. The company's first plane was entered in the Missouri State Aerocade. It is a two-place, open cockpit job, and a sweet performer. The type certificate has not yet been issued by the Department of Commerce.

J. L. (Bud) PARKER, chairman of the local Chamber of Commerce aeronautics committee, piloted the Gas Service Company's entry in the Missouri air tour, carrying RICHARD R. NACY, State Treasurer; FORREST SMITH, State Auditor, and C. O. HANES, secretary of the Jefferson City Chamber of Commerce.

ALEXANDER FITZHUGH, manager of the Greater Des Moines Committee, was a Kay See visitor in the interest of prevailing on United Air Lines to establish a Kansas City-Des Moines-Twin Cities service. He reported he had verbal assurance from W. A. PATTERSON, Chicago, president of United, that if business leaders of the four cities evidenced an active interest, such service would be established soon. Letters are being written to Mr. Patterson assuring him of patronage.

The visit of JAMES A. FARLEY, Postmaster General, to Kansas City as a guest at the Elks national convention resulted also in a promise from him that he would personally see that action was obtained on the city's requests for improved air mail service and connections. He made such promise when a group of business leaders, speaking to him informally at an Elks breakfast, urged upon him the importance to Kansas City of better air mail schedules and operations. A memorandum of the three particular matters desired by Kansas City was prepared and given to Mr. Farley, as he requested. The three items: First, overnight air mail via Route No. 2, operated by T. W. A., Inc., which would afford next-morning distribution in New York and other Eastern cities; second, improved service on Route No. 9, operated by Braniff Airways, by means of the Post Office Department's requirement that this service should be flown by multimotored, radio-equipped planes carrying passengers on a twenty-four-hour basis, which also would necessitate installation of night lighting by the Department of Commerce from Tulsa to Kansas City in order to provide the desired route; third, restoration of the direct Kansas City-Denver air mail contract.

Kansas City sent two airplanes to Tulsa to carry the largest delegation, except Tulsa's, attending the conference called by the Dallas and Tulsa Chambers of Commerce to consider a demand upon the Post Office Department for better mail and passenger service on Route No. 9. The delegation included CONRAD H. MANN, president of the chamber; COL. RUBY D. GARRETT, counsel; J. L. PARKER, chairman of the aeronautics committee; DR. JOHN D. BROCK, a director; HARRY K. POINDEXTER, vice president in charge of trade development, and W. G. AUSTIN, secretary of the Merchants Association.

Koshkonong Airport, which serves that Missouri village, also Westplains and Thayer, Missouri, was dedicated and named the J. D. Brock Airport recently, honoring the Kansas City amateur pilot whose continuous daily flying activities have piled up a record now passing 1,700 hours. Dr. Brock attended the ceremonies, which were under direction of Wayne T. Boles Post No. 23, American Legion, of Thayer. The airport provides two runways, each a half mile long and 500 feet wide. The city park and swimming pool of Thayer are located adjacent to it.

J. L. FREEMAN, secretary-treasurer of the Propeller Club, Kansas City's association of private flyers, organized a delegation of eleven entries for the Missouri State Aerocade. This was the largest single unit in the tour.

BARTON STEVENSON and W. H. WEEKS JR. have organized the Stevenson-Weeks Aircraft Service, opening up in quarters on Kansas City Airport. Stevenson has been flying in Kansas City and vicinity several years. Weeks, who is son of the general manager of the American Royal Live Stock and Horse Show, resigned from the engineering department of T. W .A., Inc., to enter the new activity. The firm is agency for the Fleet.

Lubbock, Texas

Student activity is beginning to be more active now than it has been for some time. We have an addition in aircraft on the field now, a Great Lakes trainer, being used by CLINT BREEDLOVE, airport manager, for student training and occasional cross-country work.

A. F. HOLT, local sportsman pilot, has been making several cross-country trips lately to various points over the State. He recently had his Travelair re-covered and conditioned throughout and now is making up for time lost while repairs were being made.

ART CHASE, local transport pilot, has been attending several rodeos and picnics with his Robin, and doing a fair passenger business. He has several students flying from the local 'port.

ROY NORTON of Roswell, New Mexico, and CLINT BREEDLOVE flew to Corpus Christi a couple of weeks

ago in a Great Lakes trainer to the Airport Managers meeting. They report a good time but some rough country on the way down.

Visiting transit planes in and out of the 'port in July more than doubled the record of June. It is believed that this increase is due to continued business recovery in West Texas.

To the boys who are bothered with the most noted pest around an airport hangar—the sparrow—do as BREEDLOVE has done and your troubles will be over. Breedlove has a pair of small sparrow hawks that live in his hangar, and in turn, to pay for their hangar rent, keep all the sparrows out. It would be hard to figure their dollar value, but to Breedlove they are worth plenty.

A Waco aerial ambulance has recently been demonstrated to the doctors of the Lubbock Sanitarium. The doctors were convinced that their future emergency patients will come to them via aerial ambulance.

DR. J. T. HITCHINSON of the Lubbock Clinic took his first airplane ride in the Waco ambulance together with his wife and daughter. The entire family seemed to enjoy the ride very much.

The entire flying personnel, their guests and friends of aeronautics had a chicken barbecue at the Municipal Airport Tuesday evening, July 24th. All had a good time and plenty to eat.

Marshall, Missouri

EARL SMITH, who recently flew in an NB3 purchased in Chanute, Kansas, is having the LeBlond replaced with a Velie motor. His wife is with him and they are continuing their trip north.

MR. ERVIN L. MASSEY of Norman, Oklahoma, has taken delivery of an OX Travelair bought from the Nicholas Beazley Company. This is another case in which the call of the air was heeded. He says it has been seven years since he has flown a plane, the last one he flew being a Canuck in which he barnstormed over Texas and Oklahoma.

MR. K. M. OLIVER of Mercedes, Texas, has taken delivery of an NB4 110-powered Barling.

BEN GREGORY of Kansas City was at the Marshall Airport with his Ford trimotor July 7th and 8th. He took up about 600 passengers in the two afternoons and evenings. People are becoming more air-minded!

The Second Annual Aerocade was in Marshall for a short time July 19th. There were two bands to meet the parade and the National Guard patrolled the field. A large crowd attended.

Mobile, Alabama

During the early part of July, Bates Field, Mobile's municipal airport, was visited by five private planes bearing fifteen passengers, sixteen Navy planes bearing nineteen passengers, four Army planes bearing eight passengers, and two National Guard planes bearing four passengers. These planes came from Pensacola, Atlanta, Brookfield, New Orleans, Birmingham, Montgomery, Panama City, and Richmond, Virginia, and varied in type from big Boeings to small Wacos. On July 10th, LIEUTENANT-COMMANDER GARDNER of the Naval Air Station in Pensacola led a group of fourteen Boeings into a landing at Bates Field. These planes were all on training flight from the Naval Air Station at Pensacola.

Recently the Federal Emergency Relief Administration approved the continuation of work started on the Municipal Airport at Mobile by the Civil Works Administration, and when this work is completed Mobile will have one of the leading municipal airports in the South. The work being done at the Mobile airport embraces construction of an administration building, new hangars, concrete runways and lighting the field. In addition, landscaping about the administration building and hangars is also being done.

On Friday, July 20th, Eastern Airlines, Inc., holders of the air mail franchise on the New York-to-New Orleans route, inaugurated service replacing that formerly offered with Stinson equipment by the same company, and in the new service giant fifteen-passenger Condor bimotored planes will be used. These planes will be manned by two pilots and for the pleasure of its patronage carries a hostess with each plane. Coincident with the inauguration of this service, Eastern Air Lines announced the offering of lower round trip Summer excursion fares to obtain from all points on the route to New York and return. It is expected that this latest action on the part of Eastern Air Lines executives will do much to encourage passenger travel over this route, and Mobile has hailed the new service and new fares gladly.

Santa Rosa, N. M.

H. B. TAYLOR is about ready to test hop his new, revised Heath. It is equipped with wing flaps of his own design and has several other novel features.

BUZZ HERSHFIELD just got back from a very eventful trip up to Kansas City, via some hay fields due to a bad case of Kinneritus. It seems on the one day he had a full load and a tailwind, the good old plane had to turn its toes up. However, after a week of motor trouble the old maestro arrived at the Cabra Springs Oil Company's headquarters intact, but badly shop worn. He was accompanied by HARVE TAYLOR.

LOYD BIBLE has his recently re-covered Hisso Lincoln Paige over at the Albuquerque Airport for some minor repairs. The jeloppy looks good all finished in silver and red.

H. B. TAYLOR has recently purchased a Great Lakes, in somewhat of a rolled-up condition, and is starting to rebuild it. Would like to buy some wing panels if anyone has any for sale. They seem to be more scarce than landing fields in this country.

MIKE DEMARAIS of Las Vegas, transport pilot, has taken the job of motorcycle patrolman in the Meadow City. Now we can park where we please.

Two new hangars are to be built at Las Vegas by H. B. TAYLOR and LOYD BIBLE. Cabra Springs Oil and Gas Company has just completed a new hangar 54 by 30 feet at its ranch.

MISS HARRIETT HERSHFIELD and MR. BILL ENRIGHT are at the Cabra Springs oil lease, having flown down from Kansas City in the company's Curtiss Airsedan.

The 15th of April was a sleepless night for BUZZ HERSHFIELD, and while counting sheep a low-wing speed job cruised along with the sheep. April 16th the drawing board was dusted off, and now the same

low-wing job (less the sheep) is almost ready to take the air.

The ship has a span of 15 feet 6 inches, is 4 feet 4 inches in height and has an overall length of 12 feet. It is to be powered with a Globe Aero 4 rated 55 horsepower at 2,500. This motor is an inverted air-cooled four-in-line, with dual Scintilla ignition.

The wing is of conventional construction, with solid spruce spars and built-up spruce ribs. All metal fittings are of chrome molybdenum and a compression member is built up of 5/8-inch tubing. Streamline tie-rods brace the wing from a cabane atop the fuselage to the rigid undercarriage.

The fuselage has some novel ideas in regard to the fairing. The bottom of the fuselage is concave from the motor mount to the extreme rear of the stabilizer section. This should tend to let the air flow along the fuselage instead of coming up along the sides when the ship is at high angles. If this proves successful the ship should land at a reasonable low speed. In other words, the air that comes past the fuselage should not wash out the down load on the stabilizer, and cause it to "go out" at slow speeds. The construction is of chrome molybdenum tubing, and the fairing is of spruce strips and plywood.

The instrument panel is neat and free from excess weight due to its skeleton construction. It includes the following instruments: Pioneer 300-mile airspeed indicator, Pioneer tachometer, oil pressure gauge, oil temperature gauge, and altimeter of various makes. The 300-mile airspeed is hardly essential, but it makes people ask questions.

At present the ship is ready for the motor installation. A slick finish has been applied by giving the surfaces five coats of clear dope, two of silver and two of pigmented, and a lot of elbow grease wet sanding the various coats.

The builder plans to take the ship to Wichita, Kansas, to test hop it within the next ten days. This seems more practical due to the high altitude of this country. If these test flights are successfully completed, the boys at Cleveland might get a surprise.

Topeka, Kansas

ROBERT HORSEFIELD and W. G. WOOD, both Topeka pilots, attended the Propeller Club banquet and meeting at Fairfax Airport, Kansas City, Thursday evening.

Records continue to be broken by students at the Topeka airport. R. E. TUTCHER of Overbrook, a student under instruction of M. J. CLARK JR., soloed after two hours, thirty minutes flying instruction—the lowest time for any student flyer at the school here. HAPPY SALYER also took his first solo flight after two hours, fifty-five minutes instruction. LESTER R. MARTIN, another student, passed his limited commercial pilot flight and written examinations in Kansas City. Martin is the first student of the Topeka Flying Service to receive an L. C. license and qualified in a heavier plane than the one in which he received instruction. The Flying Service also reports a new girl student, MISS ELLEN RUNYAN of Topeka. She has the earmarks of a good pilot, and we hope that Ellen will keep up her enthusiasm.

VIRGIL OLMSTEAD, aircraft operator at Old Richards Airport, Kansas City, Missouri, was a visitor at our 'port July 16th. He was flying the Waco "F" which he purchased as a crackup from LAUREEN FREEMAN. Virgil did a beautiful job of re-covering.

BART STEVENSON, noted as one of the best Monocoupe race pilots in the country, and HENRY WEEKS, his partner, firm of Stevenson & Weeks Air Service, Kansas City, Missouri, were visitors here the first part of the week. They were flying their B5 Kinner Fleet. Bart certainly looked important when he pulled out the old Haywood and we started running. We understand that Henry is now going under the name of "SWEET WILLIAM."

O. G. CORBIN, owner and builder of the Corbin sport planes, Madison, Wisconsin, spent a week calling on the old cronies here in Topeka. He flew in one of the Corbin single-seater sport planes, powered by a Salmson 9, and it impressed all the boys here that had the opportunity to fly it. Corbin says he is bringing out a new Ford-powered ship using a Model A conversion and, according to him, it is going to have a cruising speed of around eighty miles per hour. It will be licensed.

W. G. WOOD of the Topeka Flying Service went to Horton, Kansas, and hauled passengers on July Fourth. He reported a very good business, and that their two-seat Aeronca was kept busy the entire day.

BOB WHIFFEN, a local pilot, sold his Kinner Eagle to a pilot in Kansas City. Bob is going to buy another airplane, but we don't know just what. We hope he makes as good a deal as he did on his Kinner.

LOU STRICKLER, Latrobe, Pennsylvania, now a pilot at the Topeka Airport, passed his limited commercial flight test in Kansas City July 18th.

Memphis, Tennessee

Pacific Seaboard Airlines, on July 17th, added passenger service to their Chicago-St. Louis-Memphis-New Orleans air mail route. Leaving Memphis at 12:40 p. m., the plane arrives in Chicago at 6:40; leaving Memphis at 2:35 p. m., the plane arrives in New Orleans at 6:40. This schedule allows Memphis passengers to make connections conveniently at St. Louis for Kansas City, and at Chicago for New York and for Western points.

Bellanca planes will be used, each having a passenger capacity of three. The Pacific Seaboard company plans to expand its equipment, and has under consideration two new multimotored, high speed planes for possible purchase when satisfactory tests have been made.

Referring to the statement by Senator McKellar on the lack of passenger service on this line earlier, MR. PUTNAM said that the Department of Commerce has been most helpful and co-operative in assisting the line to establish the many details necessary to a dependable and conservative operation.

"At least a months' flying is advisable," he said, "before carrying passengers when any new operation is started or new equipment placed upon a route. The Department has now given us a *carte blanche* to start service whenever we please, but we prefer to complete down to the last detail the systematizing of our run. That we have accomplished more than could have been expected is shown by the fact that in our first month of operation we completed 97 per cent of our schedules, and our record so far this month is 100 per cent."

The Fourth Airways District

(Continued from page 14)

ing made in these facilities by the Bureau of Air Commerce.

The first type of radio range employed a loop type antenna, which was very satisfactory in operation except for the "night effect" which developed, causing the courses to shift direction somewhat in the early evening and morning hours. The TL antenna system was developed to correct this defect. This system employs four 125-foot steel masts, insulated from the ground, as the antenna.

Due to difficulties at first encountered with interference between radio range stations and radio broadcast stations, it was necessary to separate the two aids a considerable distance. Recent improvements in design make it possible to combine the stations, using one transmitter for both jobs and remotely controlling all operations by telephone lines from the operating room located on the airport proper. By placing the operators on the airport, better and more direct service is furnished the flying public and economy is effected in personnel, since the operators are able to take the weather observations formerly made by Weather Bureau personnel at those points.

The development of radio typewriters is nearing completion. Service experiments now under way on a circuit between the Department of Commerce Building at Washington and the Airways Radio Station at Silver Hill, Maryland, indicate that this method will prove practicable. If inaugurated throughout the Service it will effect large economies in replacing the more expensive long line telephone circuits now required in the operation of the teletype network.

New Developments and Improvements in Radio and Communications

The Department has been experimenting for several years in an effort to perfect visual radio range transmitting and receiving apparatus to replace the present aural type, the thought being that a visual indication of the plane's position relative to the radio range course would be more desirable from the pilot's standpoint. Apparatus was perfected for the purpose; however, the cost to the aircraft operators for receiving equipment and to the Department for the necessary changes to present radio range equipment was found to be out of line with the benefits derived. The cost to the Department would have been approximately $500,000. Recently the radio engineers of the Bureau of Air Commerce have perfected a receiving device which fits into the instrument panel of the plane. It has an open face with a vertical and a horizontal needle. The vertical needle remains centered if the plane is on course and moves to the right or left as the plane moves off course in these directions. The horizontal needle indicates the volume of the signals being received, which is roughly proportional to the distance of the plane from the transmitting station. This device is used in conjunction with the plane's regular radio receiver by attaching a small converter unit thereto, thereby giving the pilot the choice of either aural or visual range signals or both. In order to make this system effective it will be necessary to change the present off-course signals of the range from *a* (dot-dash) and *n* (dash-dot) to a dash in one case and a dot in the other. Although this change can be made for a very nominal sum, the

THE "A" TYPE RADIO MARKER STATION AND TELETYPE STATION LOCATED ON THE GAINESVILLE FIELD
This field was formerly a Bureau of Air Commerce intermediate landing field. The City of Gainesville co-operated with the Bureau in its establishment by furnishing the land rent free. The City recently took over the field and is now operating it as a city airport. The hydrogen shed and box mounted on a post at the extreme left shelters the weather observation equipment, while the pole back of the house carries the receiving and transmitting antennae of the A-type radio marker.

Bureau has indicated that it will not be made on the Federal Airways until the device has been given practical service tests by pilots who fly the airways regularly and there is a popular demand for it.

An improved system of airways is being installed by the Bureau of Air Commerce on the new routes now under survey and construction. Adequate and completely equipped intermediate landing fields are being installed at fifty-mile intervals. The fields will be boundary lighted and equipped with rotating beacons as at present, with rotating airway beacons placed on a direct line between the fields at the usual twelve- to fifteen-mile intervals. However, each field will have a miniature radio range and two-way radio facilities for ground-to-plane communication. These stations will broadcast the weather to the planes. It is proposed to utilize the radio typewriters, before mentioned, at each field when the development of this new device has been completed.

In conclusion it is desired to emphasize the thought, with which the general public is probably not familiar, that the Federal Airways System as now operated provides far more and infinitely better aids to safe air transportation than are enjoyed by the motorist and highway transportation units. The light plane equipped with nothing more than an altimeter, tachometer and oil gauge, as well as the high speed plane with full two-way radio equipment, flight instruments and night flying equipment, can fly the airways safely and with the assurance that the various aids and safety devices are at their service twenty-four hours a day, in good weather or bad. The extent to which these aids are employed depend on the ability of the pilot and the equipment which he has installed to take advantage of them. They are adequate to meet any emergncy and condition if used with intelligence and good air judgment—known on the ground as "horse sense."

Wings For An Industry

(Continued from page 7)

centers through nearly one thousand miles of pipe line system and carries important interests in subsidiary companies which dispose of by-products in petroleum manufacture.

Evidence of the rapid growth and progress of the Phillips organization is its marketing department, which came into existence in 1927. In seven years time since the formation of the marketing department, Phillips products are practically a by-word in seventeen states.

This meteoric and steady growth has been furnished, in large part, by the consistent use of aircraft. In 1926, Billy Parker, one of Oklahoma's pioneer pilots, ceased operation of his aviation school at Dewey, Oklahoma in order to join the Phillips Petroleum Company.

His identification with the newly formed Aviation Department of Phillips was two-fold. He ran tests on the use of natural gasoline in airplane and automobile motors, and he flew Phillips' executives on "hurry-up" calls to their far flung properties in the Mid-continent area. At the present time Parker heads the Phillips aviation division and is flight commander, so to speak, of the fleet of seven airplanes.

The present equipment comprising the Phillips fleet are a seven-place Lockheed Vega, a Wasp-powered six place Travelair, a four place Travelair powered with a 240 horsepower Wright J-6, a five ylace Travelair powered with a 300 horsepower J-6-9, a Star Cavalier, Genet powered, and two Cavaliers powered with Lambert motors.

In August Phillips will take delivery from Lockheed of a new Orion with a 700 horsepower Cyclone motor, and in September will receive from the same factory an Electra to replace the Ford tri-motor which, until recently sold to a new transport line, was the flagship of the Phillips fleet.

Under the able leadership of pioneer Parker in the Aviation Division are Clarence Clark and Jack Stewart, pilots; E. H. Shults, Ira Simmons, Charles Peters and W. J. Shelton, mechanics. In addition to this force which flies and services all Phillips' planes, is George Greiner, a layman whose work for the company takes him all over the broad prairies of Texas and Oklahoma. Greiner has a Star Cavalier, which he learned to operate a few years ago. He now puts it to use on all his long hops.

The most significant feature of the Phillips Petroleum Company's use of aircraft in expediting its business transactions is the fact that in seven years of consistent use of airplanes, there has never been an accident—a tribute not only to the skill of the flying personnel, but also to the efficiency of the mechanical force which services and maintains the equipment at Phillips' airport in Bartlesville.

Supervision of the executives' flights is but a small part of Billy Parker's work. As head of the aviation division of the Company, he is responsible for the sale of Phillips Aviation Products. This assignment takes him over the entire territory. He is a well known figure at every airport, whether it is large or small.

Thus Phillips Oil Company is convinced of the utility—nay, the necessity of an efficient Aviation Department not only to facilitate the sales and distribution of the aviation products, but as a means of executive travel as well. And the significant fact is added that new uses are constantly being discovered to increase the utility of Phillips' flying equipment.

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The Professional Air

(Continued from page 21)

education will necessarily hold the open sesame for the entrance of tomorrow's executives into the profession.

The executive transport course in our American colleges of the air fulfill the exacting requirements of commercial aviation. Again we quote the record of Parks to illustrate the point in discussion. More than 50,000 hours of student training have been given at Parks during the past five years without fatal accident. The safety factor is of necessity paramount in the ranks of commercial aviation and air colleges. The figures undeniably substantiate the fact that the young man of today who desires to prepare himself for the profession of flying need not undergo undue hazard or risk than he might undergo in training for other professions. Nor is it presuming too much to believe that training in aeronautics actually offers less risk than various other professional training courses.

The executive transport course affords the professional pilot with the necessary mental equipment. One of the most widely accepted necessary attributes lies in the pilot's ability to fly by instruments, completely blind in reference to exterior properties. Adequate blind flying training and experience goes into the curricula of the executive transport student; it is prerequisite in almost any type of modern flying; the student must thoroughly demonstrate his ability to fly blind in order to qualify for graduation.

A fundamental knowledge of radio and meteorology is required. Navigation, a complete knowledge of engines, repairs and maintenance are learned with practical application of each subject. The pilot must prove his ability to fly properly any and all types of modern aircraft after complete instruction in the peculiar characteristics of each type has been given. This training equips the pilot with confidence; the ability to fly any variety of the most commonly used types of airplanes comes from actual flight training. Other integral subjects that complete the training are aircraft design, operations, familiarity with the network of our national airways, the legal aspects of flying, and the aforementioned professional training in business methods. All go into the now universally admitted necessary course of instruction.

To be sure, the days are now gone when Tommy purchased an ancient crate and got Bill to teach him to fly in four hours or ten in order that Tommy might apply for a job with the "Cross-Country Aircraft & Transport Company." The industry is and always will be in need of highly trained men. It has no place for the haphazard and insufficient type of training. Competition is too keen, even in the industry that has experienced healthy growth in the face of one of the most serious economic depressions the world has ever known.

The multicellular wing of the Douglas Transport. Left: The fuselage, engine nacelle and wing stub. Note the corrugated reinforcing under the smooth skin covering of the stub. Right: End view of wing showing rib construction, the three spars, the numerous skin stiffeners and method of rib installation.

Inspection of Aircraft

(Continued from page 17)

dition of the fastening of these shingles, as they may present a perfect appearance on the ground, while in the air the force raises them clear at the joints. Pressing down the wood just in front of the joint will immediately reveal any defect.

It is appropriate to note at this point that fittings bolted to wooden members should not be drawn up tight enough to crush the wood (which is quite possible in the case of soft woods used in aircraft construction) but tension on the bolts should be such that there is no possibility of the fitting ever moving.

The bolts attaching the wing to the fuselage must be tight and show no evidence of stretch. Covers over wing fittings may be removed and the fittings inspected for cracks and tightness.

Wings of cantilever construction covered with metal present essentially the same problem as the wing covered with wood. Rivets attaching the skin to the main structure must be tight. In the replacement of rivets and skin on metal airplanes, it is the responsibility of the inspector to ascertain that the replacement parts are of the same quality material and the same heat treatment as specified by the manufacturer. Any skin distortion on a metal wing is nearly always indicative of a broken or buckled member in the main structure and should be investigated.

On nearly all the new metal transports, the trailing edge of the wing from the aileron to the fuselage drops down to provide air brakes for landing. These flaps should be operated and the operating mechanism inspected for possible defects. Methods of operating flaps are so widely diversified that they cannot receive treatment in this article. Attachment fittings on the wing spars are subjected to rather severe loads at times and should, in consequence, be surveyed for impending failure.

Ailerons must operate freely and their controls must be free from slack. Nearly all ailerons on the later models are mounded on ball-bearing hinges, and very little trouble need be anticipated from this source as long as the bearings receive the proper lubrication.

Air speed hose connections in the wing should be checked for deterioration while the inspection covers are removed; the pitot head of the air speed indicator should be securely fastened to the wing.

Planes having retractable landing gears require examination of the landing gear attachment fittings on the wing as well as the condition of the structure in the wheel recess. All landing gear loads are applied to the wing spar as a rule and this warrants an unusually close inspection of all the support members associated with the mechanism.

Of all the components of the airplane, the wing offers the smallest amount of trouble to the inspector. This fact, however, does not preclude the necessity of a careful check of each portion of supporting surfaces. When the inspector has become thoroughly experienced, the routine of inspection becomes natural to him and the defects in the aircraft become more quickly apparent as his experience increases. When the routine prescribed in this now completed series of articles has been followed, there are but few parts of the airplane that remain to be checked.

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From Washington

(Continued from page 19)

fices from New York to Washington, D. C. on August 10th.

In making the announcement July 28 Leighton W. Rogers, executive vice-president who has been in charge of Chamber activities since its reorganization a year ago, said that the Board of Governors authorized the change in headquarters for the convenience of the rapidly growing membership and in recognition of the fact that official regulation and supervision of aviation are largely Federal and concentrated in the national capitol.

"Adequate representation of all branches of the industry makes it imperative that we establish executive offices in Washington," said Mr. Rogers. "During the last year the Chamber has negotiated the air transport and the aircraft manufacturing codes, and its several service departments have been reorganized to bring it in line with the best trade association practice to facilitate cooperation with the NRA, the Department of Commerce and other branches of the Government dealing with aviation."

The aeronautical library and general information service of the Chamber will remain in New York.

The new offices of the Chamber will be located in the Shoreham Building at 15th and H Streets N. W., Washington.

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Aircraft 1934

(Continued from page 20)

absorb the entire output of the plant for several months.

Warren Worcester, formerly of Cambridge, Mass., but now an adopted son of San Diego, purchased plane No. 1. Peter Dana, transport pilot at Holderness, N. H., made a special transcontinental flight to San Diego and immediately ordered plane No. 2.

Kinner 300 H. P. Monoplane

(See Front Cover)

A RELATIVELY new Kinner four place, externally wire braced, low-wing cabin monoplane combines performance and comfort with the characteristic Kinner attractiveness of design. The new plane is in production at the Kinner Airplane & Motor Company's plant.

Cruising at 150 miles per hour and landing at 46 miles per hour with the flaps in operation, the new Kinner model is capable of a top speed of 165 miles per hour. Other performance data recently issued after thorough test flights includes a service ceiling of 17,000 feet. Rate of climb under full load at sea level is 1,100 feet per minute; at 6,000 feet altitude the climb is 500 to 700 feet per minute; and at 9,000 feet, 350 to 500 feet per minute.

Full load includes the pilot and three passengers, fuel and baggage. Gross weight is set at 4,000 pounds. Gasoline consumption averages 20 gallons per hour under full load at cruising speed of 150 miles per hour. Fuel capacity is 85 gallons, which permits an efficient and practical cruising range.

The new monoplane is powered with a 300 horsepower seven-cylinder Kinner engine. The N. A. C. A. cowling is completely streamlined into the fuselage. An adjustable Hamilton Standard metal propellor, electric generator, 12-volt storage battery, which is removable from outside the ship, are other outstanding features. The electric starter is the direct-drive Eclipse with solenoid switch. The instrument panel is indirectly lighted. The dual control column is of the throw-over type and the dual pedals are removable. The airbrakes are of the flap type on the trailing edge of the wing and are motor operated. The controls are ball-bearing throughout. The tail wheel is steerable and the wide landing gear is completely streamlined, including the wheel pants.

The plane is completely bonded for radio and the engine is provided with special shielded magnetos and spark plugs in addition to the usual shielding for radio. The Westport radio receiving set has direct reading remote control. All necessary instruments complete the standard equipment of this altogether attractive and performing Kinner.

The National Air Races in Cleveland

TWENTY-FIVE YEARS OF PROGRESS in competitive flying will be portrayed at the National Air Races in Cleveland, August 31 to September 3, 1934. The first airplane competition was conducted at Rheims, France in 1909, honors being won by the late Glenn Curtiss, representing the United States, with a speed of 47 miles per hour.

Since that first meet 25 years ago speeds have increased tremendously, reaching more than 400 miles per hour in the Schneider competition. Major James H. Doolittle averaged over 252 miles per hour in a land plane in the Thompson Trophy race, which will be a feature of the coming Cleveland meet. Col. Roscoe Turner has flown from Los Angeles to New York in 10 hours, 4 minutes and 30 seconds, averaging almost 300 miles per hour.

It is the plan of the National Air Race management to present to air race visitors a display of historic aircraft which have had an important part in the progress of aviation. Airplanes which took part in competition years ago, or their replicas, ranging from the old-time "box-kite" pushers to the latest streamlined transports.

A number of new racing planes, in the five-mile-a-minute class, are being completed for this year's competitions, according to the officials in charge of the Cleveland meet.

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Maintenance Men Meet in Chicago

On July 12 and 13 at the Palmer House in Chicago, the Maintenance Committee of the Aeronautical Chamber of Commerce met and discussed prevailing maintenance problems of airline operations. American Airlines, United, Bowen, TWA, Western Air Express, Braniff, Central Airlines, Kohler Aviation Corporation, Pennsylvania Airlines and representatives of the larger manufacturers were present. On the afternoon of July 13 the group inspected the shops of TWA, United and American Airlines on the Chicago Municipal Airport. The meeting, which is a semi-annual affair, will meet again in December at Brownsville, Texas.

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Bowen Installs Radio Director Finder

Bowen Airlines have recently installed the radio direction finder as standard equipment. The recent installation of the facilities, which have been the subject of wide research in the Radio Division of the Bureau of Air Commerce, marks its first adaptation to airline operation. One of the Bowen Lockheeds has been equipped with the direction finder for over fifty hours of highly satisfactory service between the Gulf and the Great Lakes.

Brant Conway, Radio Engineer for Bowen, built and adapted the new radio equipment in the Bowen shops on Meacham Field, Fort Worth.

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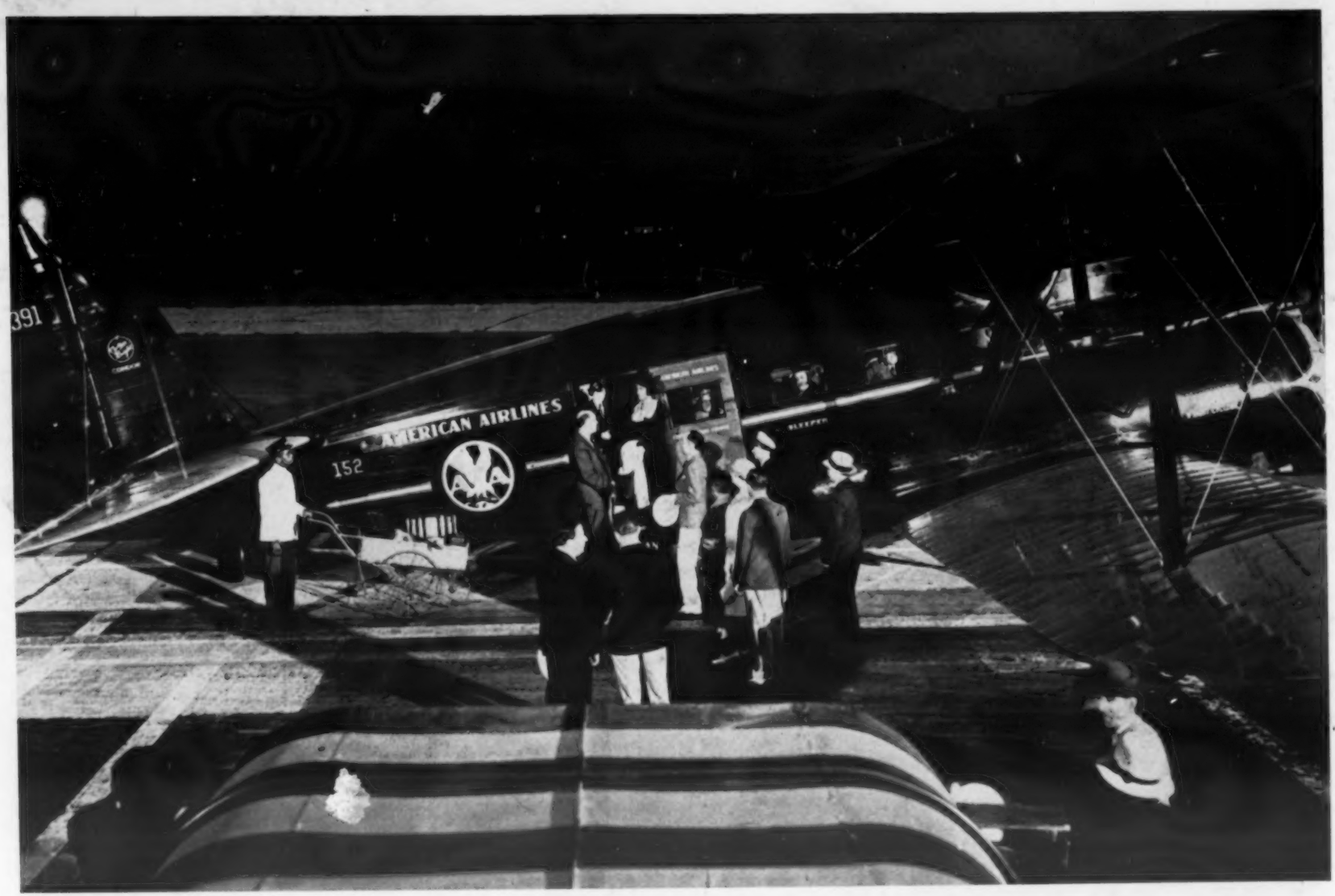

Passengers boarding the American Airlines Sleeper Plane in Los Angeles at dusk, sleep comfortably thru the night to wake the next morning at the aerial cross-roads of the Southwest, from where they continue their air journey to the East, Mid-West or South. The night schedules operating daily between Dallas, Fort Worth and the Pacific Coast have proven so popular that the sleeper plane service has attracted world-wide attention. The service was inaugurated between Chicago and New York on July first.